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ENVIRONMENTAL ASSESSMENT REVIEW PANEL

IN THE MATTER OF AN APPLICATION BY FOOTHILLS PIPE LINES (YUKON) LTD. TO THE MINISTER OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT FOR A GRANT OF THOSE INTERESTS IN THOSE AREAS OF TERRITORIAL LANDS IN THE YUKON TERRITORY AS MAY BE NECESSARY FOR THE CONSTRUCTION AND OPERATION OF THE SAID NATURAL GAS PIPELINE AND THE WORKS AND FACILITIES CONNECTED THEREWITH AND INCIDENTAL THERETO,

AND

IN THE MATTER OF A PANEL TO REVIEW THE ENVIRONMENTAL ISSUES RELATED TO THE PROPOSED ALASKA HIGHWAY GAS PIPELINE.

THE CHAIRMAN: DR. H. M. HILL

MEMBERS: DR. O. HUGHES
MR. L. CHAMBERS
MR. B. J. TREVOR
MR. C. WYKES
DR. D. LACATE

P R O C E E D I N G S

VOLUME 11

WHITEHORSE, Y.T.

JULY 13th, 1977

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1 Whitehorse, Y.T.

2 July 13th, 1977.

3
4 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

5
6 MR. CHAIRMAN: Could we
7 convene? This afternoon we'll continue discussion on the
8 possible Dempster lateral and I believe we are at Mr.
9 Parkinson. You studied the Dempster lateral in part. Do
10 you have comments on the Dempster lateral?

11 MR. PARKINSON: Thank you
12 Mr. Chairman. As part of our involvement in assessing or
13 comparing the various alternative routes for the -- that
14 we discussed yesterday, we dug into the availability of
15 data with respect to the proposed Dempster Highway lateral
16 and I'll just read through a bit of a statement on the
17 findings of our efforts.

18 Our objectives were to
19 establish whether the existing environmental data base is
20 adequate for environmental assessment with respect to the
21 proposed Dempster Highway lateral and to identify environ-
22 mental sensitivities and to suggest additional studies if
23 necessary to fill out the data base.

24 Overall, we find that the
25 environmental data base is not adequate for decisions re-
26 garding pipeline route selection or for accurate environmental

1 impact assessment of pipeline construction on the corridor.
2 Of the environmental components considered, geology,
3 hydrology, fish, mammals and vegetation, the geological
4 component alone is considered to have sufficient data for
5 initial decision making and the data for the remaining
6 components is really quite sparse indeed.

7 Dealing with the environmental
8 geology. In general the data base for environmental
9 geology is good and particularly so for bedrock geology.
10 Photo terrain typing has been done several times and good maps
11 are available for both the north and south ends of the
12 proposed corridor. Considerable information is held by
13 the Department of Public Works and the various operators
14 who have been working the area for many years, as far back
15 as 1955. This data consists of seismic and drill hole
16 data.

17 Detailed studies are ex-
18 pected -- of expected trouble areas may be warranted after
19 reviewing all the environmental data -- environmental
20 geology data if it can be accessed. Much of the data
21 is in the hands of seismic companies' operators, who, for
22 reasons of their own, may not yet be ready to share.

23 The principal environmental
24 geological sensitivities are the potential permafrost
25 problems for parts of the corridor, seismicity in the
26 Richardson Mountains, and aggregate sources north of the

1 Ogilvies. The proposed corridor lies near continuous
2 permafrost- beyond the limit of glaciation and thus has a
3 high potential for terrain disruption , particularly between
4 North Fork Pass and Chapman Lake and on the Peel River
5 Plain. Otherwise, the corridor parallels the highway and
6 stays on the ridge crest between the Ogilvie River and
7 up slope pediments of the Richardsons and much terrain
8 damage can be avoided.

9 Therefore, any route through
10 the middle of the Eagle Plain Basin is not to be encouraged
11 because of the greater terrain instability problems.

12 At Engineer Creek, the
13 highway location cramps the space available for a pipeline.
14 For this reason, an alternative descending the Blackstone
15 River is favoured. With this location the Ogilvie River is
16 gained via the pediment slope that leads to Soldier Creek.
17 In general, this suggestion would place the pipeline where
18 there is usually more space and suitable materials for
19 ditching and aggregates.

20 On the east side of the
21 Richardson Mountains, the alignment should stay close to
22 the highway to avoid ice rich slopes. . A more direct
23 alignment from the Peel River Plain passing to the south
24 of Fort McPherson and to the north of Arctic Red River
25 is preferable to staying close to the highway in this
26 section. This will utilize more stable terrain with regard

1 to permafrost problems. The Dempster is endowed with an
2 extraordinary amount of unique geological features associated
3 with para-glacial processes and efforts made to -- and
4 efforts should be made to avoid excessive disruption of
5 these.

6 With respect to permafrost,
7 additional studies in the engineering design phase over the
8 whole length of the proposed Dempster lateral will be needed
9 due to the importance of this factor. More information is
10 needed about the seismicity in the Richardson Mountains
11 and a long term monitoring project,
12 which will not interfere with construction planning and
13 scheduling.

14 Aggregate sources north of
15 the Ogilvies need to be identified so impact assessments
16 on their use can be made. The Soldier Creek cross-over
17 needs about six exploratory drill holes, particularly on
18 the east side, in order to give an approximation of the
19 ice rich silt conditions. This and the gravel problems
20 can be carried out in one field season quite easily.

21 The level of hydrometric,
22 sedimentological and geotechnical data available is
23 extremely rudimentary. Data on ground water flow regimes
24 is virtually non-existent. The main concerns identified
25 so far concerning water crossings and ground water relate
26 to increased sediment loads in rivers, stability of crossings

1 of rivers and the potential for interflow ponding and
2 creation of orifice . Necessary additional undertakings
3 include, gauging of major stream crossings to provide flow
4 data for peak discharge and scour depth calculations,
5 establishment of sediment regimes of several major rivers
6 and streams, evaluation of the effects of the Dempster
7 Highway crossings on sediment load to help design miti-
8 gation measures, and field monitoring of the ground water
9 flow regime under a variety of permafrost conditions
10 to evaluate the magnitude of potential ponding and orifice
11 problems.

12 A time period of three to
13 five years would be necessary to provide the data base
14 for an adequate environmental impact assessment. Wild-
15 life, the data base is inadequate at this time to adequately
16 assess the wildlife distributions and sensitivities to
17 pipeline related disturbances along the Dempster corridor.
18 Wildlife habitats along this route are sensitive to
19 disturbances and their recovery from adverse impacts is
20 expected to be slow.

21 The major wildlife sensitiv-
22 ities so far identified along the Dempster include the
23 Porcupine caribou herd during spring and fall migrations,
24 Dall sheep populations in the Ogilvie and Richardson
25 Mountains, grizzly bears throughout the area and nesting
26 populations of peregrine and gyr falcons.

Studies needed to alleviate these deficiencies should center on basic stream inventory data, distribution and sensitivity of spawning, overwintering, and rearing areas in the major drainages. The information on the sensitivity of Alpine head water streams to disturbance. A minimum of two years seasonal

1 data collection would be desirable to obtain this necessary
2 information. The need for these studies is amplified due
3 to the probability that construction of the Dempster Highway
4 has already caused an undetermined impact on the aquatic
5 systems and as a result, they may be more sensitive to
6 further disruption.

7 Vegetation. The vegetation
8 data base for the overall corridor is inadequate to fully
9 assess the concerns of pipeline construction on planned
10 communities. The best data at present, relate mainly
11 to the southern Ogilvie Mountains and the MacKenzie Delta
12 portion of the route. And, other botanical studies are
13 in progress but as yet unpublished. The main concerns for
14 vegetation that have been identified to date are the crossing
15 of extensive areas of sensitive tundra plant communities.
16 The presence of many rare species and unique vegetation
17 types and the feasibility of revegetation and restoration
18 of the tundra.

19 The area of the proposed
20 IBP reserve between North Fork Pass and the Chapman Lake
21 area is highly sensitive. Studies required to overcome
22 the data deficiencies centre on revegetation test plots
23 on a variety of terrain types along the Dempster, a survey
24 of natural revegetation success in areas disturbed during
25 construction of the highway, a survey along the Dempster
26 to determine the distribution of rare and unique vegetation

1 types or species and the study on the potential effects
2 of gaseous emissions from compressor stations on lichens.
3 A minimum of three years' data would be needed to assess
4 success of revegetation measures although a longer period
5 would be desirable. Other studies could be done in one
6 or two years.

7 And that settles up our find-
8 ings and any discussion of the statements I would refer it
9 to our various experts.

10 MR. CHAIRMAN: Thank you
11 Mr. Parkinson. Are there questions from the panel?
12 Dr. Hughes?

13 DR. HUGHES: Just from casual
14 observation, I've got the impression that Alpine tundra
15 of the type that you get on the, say the sixty mile road
16 where you're dealing almost entirely with vegetation that's
17 on well drained ridges, is quite different to the Alpine
18 tundra that you would get on the Dempster lateral where
19 the pipeline routing tends to be on valley floors and much
20 wetter site, and therefore, needs to be a -- there's
21 tundra and tundra and needing quite different -- am I --
22 is that a reasonable assumption or --

23 MR. PARKINSON: I would ask
24 Doctor Mathews to respond to that.

25 DR. MATHEWS: Yes, I think
26 you're quite correct in making that statement. There's

1 certainly a great difference between Alpine tundra,
2 perhaps underlain by bedrock which is well drained and
3 low land tundra which may be very ice rich and subject to
4 permafrost degradation. In my relative rating of tundra
5 I gave all tundra types a high impact rating, because I
6 still wasn't sure to what extent one may be less sensitive
7 or more sensitive than another in regard to potential
8 for revegetation. Although, if you were to perhaps compare
9 them and try to distinguish I would probably rate the low
10 land Alpine tundra, flat tundra with a high ice content,
11 certainly is more sensitive than, perhaps, Alpine tundra,
12 but, I think that hinges somewhat on the feasibility
13 of revegetation and I really wasn't going to make an
14 assessment of that at this stage. But I think you're right.
15 There is a fundamental --

16 DR. HUGHES: There would be
17 different problems.

18 DR. MATHEWS: Oh yes, I think
19 so. But, in terms of sensitivity, I still rated all
20 tundra types as highly sensitive. I didn't try to dis-
21 tinguish between the two on this initial overview. But,
22 certainly there is a difference.

23 DR. HUGHES: Thank you.

24 MR. CHAIRMAN: Any other
25 questions from the panel? I'd like to make known now a
26 list of studies we received from Dr. V. E. Hume, who works

1 with D.I.A.N.D. in Ottawa in the highways group and it's a
2 list of some sixteen studies that were carried out in the
3 area of the Dempster Highway during planning and construc-
4 tion of the highway. So these will be available from Mrs.
5 Archibald should anyone wish the list.

6 I noticed, Mr. Parkinson,
7 in your comment on the fishery that the concern was that
8 there was already some damage done because of the construc-
9 tion of the highway and therefore the fishery -- the fish
10 may be in an even more precarious position which--we've
11 heard quite a bit of argument throughout our sittings
12 that since the highway in the southern Yukon is already
13 there that -- and the damage is already done and therefore
14 the incremental damage is likely to be
15 less but this argument seems to be the reverse of that
16 because the argument seems to be because the highway is
17 there then the fish may be even in a more precarious
18 position. Is that my understanding of what you're saying?

19 MR. PARKINSON: Yes, that
20 is true and I'd ask Mr. Jenkins maybe to expand on that
21 slightly.

22 MR. JENKINS: Yes, that's
23 the correct interpretation of my statements. I think that
24 it's true that the incremental damage to the fish resources
25 as a result of pipeline construction along that highway
26 may be less but what we have to keep in mind is the

1 additive effects of these activities over a specified period
2 of time. So, the additive effects on the fish populations
3 along that route may be much more significant than what
4 you would conclude if you just looked at the potential
5 effects associated with pipeline construction. We have
6 no way of assessing, really, what the magnitude of the
7 impact was on the fish resources as a result of the
8 Dempster Highway construction but I think it's a fair assumption
9 to say that there was a certain amount of impact.
10 Right?

11 To what extent the fish
12 resources are more sensitive is hard to say so I think
13 that we should work on the assumption that there has been
14 some impact and that pipeline activity would add to that.

15 MR. CHAIRMAN: Okay, this
16 brings up the point of the Dempster Highway, then, in this
17 case. Are you suggesting that it adds a complication to
18 environmental studies in that the existing situation is
19 more difficult to determine because it's in a changing
20 state?

21 MR. JENKINS: No, I don't
22 think it's any more difficult to assess what the existing
23 situation is but it is difficult to assess the sensitivity
24 of the fish resources along that route because we don't
25 have good data to indicate what the prehighway conditions
26 were.

1 MR. CHAIRMAN: Yes, what I
2 trying to determine is whether or not the studies would be
3 more complicated because the highway is there and new than
4 if the highway wasn't there at all.

5 MR. JENKINS: No, I don't
6 think I'm suggesting that the studies would be any more
7 complicated but the argument is to indicate or to impress
8 upon the panel the need for those studies as a result of
9 the fact that the fish populations might be more sensitive
10 as a result of highway construction.

11 MR. CHAIRMAN: All right.
12 Thank you. Mr. Wykes?

13 MR. WYKES: Mr. Parkinson,
14 perhaps either you or Mr. Jenkins would comment on the
15 thought that I have that the Dempster lateral for at least
16 the southerly section would parallel streams such as the
17 North Fork or the Klondike, the Blackstone and Ogilvie
18 Rivers, that quite long section. I just wonder, in a
19 general way, whether or not you see different impacts or
20 different magnitude of impacts that could be realized by
21 a pipeline in paralleling quite closely streams rather
22 than--a lot of our discussion in the past has been in
23 terms of river crossings, and just the different type of
24 impact that might be expected.

25 MR. JENKINS: I think it's
26 a fair statement to say that the magnitude, well, in fact,

1 even the kinds of impact you could expect to occur in
2 aquatic systems will vary depending upon whether you
3 parallel or cross a stream. I know it's a common feeling
4 that crossing of streams over given distance could result
5 in less impact than a similar distance for paralleling
6 one particular waterway. I'm not sure I necessarily agree
7 with that and I took that into consideration when I assessed
8 potential risk along the Demspter lateral because my
9 definition of crossings was not just an established
10 waterway so much as to include seasonal drainage channels
11 which may not have any value for fish, but which would,
12 in fact, have potential to contribute to the impact that
13 a receiving water would experience. In other words,
14 drainage channels that flow into, say, the Blackstone,
15 that would be crossed with the pipeline route paralleling
16 the Blackstone would, in fact, contribute to impact in
17 the Blackstone River, even if the Blackstone River itself
18 wasn't crossed,

19 So, from the point of view,
20 of say, siltation or introduction of pollutants into
21 the Blackstone River, that's taken into account by in-
22 vestigating the number of channels, whether they be
23 seasonal or not, that do flow into the Blackstone. Now,
24 that's just one kind of impact that's being considered,
25 You also have to look at burrow areas but, and a number
26 of other kinds of impacts, but, as an example, I think

1 that makes it clear.

2 MR. CHAIRMAN: Thank you.
3 Mr. Chambers?

4 MR. CHAMBERS: I think I
5 could probably direct this question to Mr. Parkinson.
6 Over the last day or two we've had several comments on the
7 highway, the Dempster Highway itself and I suppose one
8 question I'd like to ask, have you any feeling in trying
9 to take a look at the existing resource data that is on
10 the Dempster, is it -- or do you have a feeling for it, is
11 it possible to now do an impact statement on the Dempster
12 Highway itself, or is it the same kind of feeling that
13 there has been a lack of data so it's sort of picking the
14 situation up, as it is, from here?

15 MR. PARKINSON: Yes, I
16 think to do an impact statement on a linear development,
17 you need much of the same kinds of data and I would say
18 that our conclusion is that there is insufficient data
19 to do a proper environmental impact statement on the
20 highway.

21
22 MR. CHAMBERS: Yes, you're
23 saying there is not sufficient data to do a proper impact
24 statement upon the highway but the highway is already
25 there and, you know, what's the feasibility of doing an
26 impact statement on a highway after it's built. I suppose

1 that's the question I'm asking.

2 MR. PARKINSON: Well, you're
3 right. Environmental evaluation of the effects, I suppose,
4 we'll get into terminology when we start these discussions,
5 but, the environmental data base, according to our review
6 research here is not adequate to really do a good job.

7 MR. CHAMBERS: So, you really
8 can't evaluate the impact that the highway has had because
9 of insufficiency of data prior to the construction of it.

10 MR. PARKINSON: That's true.

11 MR. CHAIRMAN: Okay, do any
12 of other advisors have questions for Mr. Parkinson?
13 Mr. Surrendi?

14 MR. SURRENDI: Is this
15 working? I was just curious as to the reference to a
16 two year period for research on some of the mammal pop-
17 ulations that were identified and how that particular time
18 period had been arrived at.

19 MR. PARKINSON: Yes, I'll
20 ask Doctor Guthrie to speak to that one.

21 DR. GUTHRIE: That's a pretty
22 rough approximation and that's the way it was arrived at
23 in -- you can tell a great deal about mammal populations
24 and their sensitivities and their use of resources in one
25 year if you're lucky enough to get a good year but I'd
26 sure hate to have tried that last year so, for that reason,

1 I feel the minimum -- two years is a minimum and more is
2 highly desirable, especially when you're talking something
3 like the Porcupine caribou herd. In that situation, though,
4 we're a little better shape because of the work that the
5 Canadian Wildlife Service has done on the Porcupine
6 caribou herd and in conjunction, I think, with consultant
7 groups who have studied that, but, it's fairly obvious
8 from reading those reports that that herd does different
9 things different years and with that kind of variability
10 if we didn't have any data at all on it, I think you'd
11 be looking at five or ten years worth of examination to get
12 a pretty good handle on all of the things that the Porcupine
13 caribou herd does. But, with the background that the
14 Canadian Wildlife Service has put together, I feel that
15 probably another two years of cleaning up the edges would
16 do that.

17 The other populations which
18 are less migratory and tend to use single areas could
19 probably, you could probably get adequate studies in
20 two years, I feel.

21 MR. CHAIRMAN: We'll hear
22 later from Mr. Surrendi on caribou. Mr. Romaine, do you
23 have any questions?

24 MR. ROMAINE: Just a few
25 comments Mr. Chairman. As you recall yesterday you asked
26 the question as to how much time would we require to

1 in order to collect information required for an adequate
2 environmental impact statement. We worked through that
3 this morning and the time periods that we came up with
4 correspond to those identified in general with Mr. Parkinson
5 just made.

6 Just a couple of other points,
7 not to depart from this. You also asked us for what in-
8 formation that we were aware of or work that had been
9 done on the Dempster, I could you a quick gloss of that now
10 or perhaps provide it to you on a typed page.

11 MR. CHAIRMAN: Yes, I think
12 that would be the best way to handle the information. If
13 you could hand it in to Mrs. Archibald and then everyone
14 here would know that we have it and where it could be
15 obtained. And we will make available a consolidated list,
16 somehow, as part of our reporting.

17 MR. ROMAIN: And just the
18 final point then. There was a question raised by the
19 brief presented on behalf of the village of Old Crow with
20 respect to concerns over mercury, and we do have Mr.
21 Larry Ottman here from fisheries who could provide you
22 some information on that if you so wish it.

23 MR. CHAIRMAN: Fine. We
24 might as well have that now then. Okay.

25 MR. OTTMAN: Mr. Chairman,
26 my name is Larry Ottman, I'm a fishery officer in town

1 here. Unfortunately I was unable to be here yesterday,
2 but, possibly through some conversations and some peronal
3 experiences, I can shed a little light on the mercury
4 program.

5 I was talking with my
6 supervisor and he stated that there had been a study done
7 in 1971, where they took samples for mercury in the Old
8 Crow River. This was published in 1973. They did find
9 that there was levels of mercury which were above normal
10 in fish that were taken from the Old Crow River. I think
11 we can divide the fish up into two parts. The first part
12 being salmon which do not, being anadromous , do not spend
13 their whole life cycle in the Old Crow River and there
14 was nothing found there. However, in the indigenous
15 species, in particular, Inconnu and Burbett(?) or Losh(?)
16 as the Old Crow people call it is where they found the
17 levels of mercury.

18 As far as we know there is
19 no industrial development at all on the Old Crow or the
20 Porcupine system, so that we assume that this mercury
21 is natural and possibly it could have been there for
22 hundreds of years. We just don't know.

23 Possibly a little more on
24 that. We are currently undertaking a study now, which
25 will, the samples will be completed by December 31st of
26 '77, where we are sampling twenty two locations in Yukon,

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1 specifically for a mercury sample.

2 MR. CHAIRMAN: Thanks very
3 much. Do you have any more questions for Mr. Parkinson?
4 Mr. Klassen?

5 MR. KLASSEN: I just had the
6 one question and Mr. Surrendi asked it.

7 MR. CHAIRMAN: Fine. Mr.
8 Bouckhout?

9 MR. BOUCKHOUT: Just one
10 question Mr. Parkinson. You mentioned under the topic
11 of geology, what you would consider a preferred routing
12 on the Eagle Plains. Would you go over that for me again,
13 please. I didn't catch it while you were saying it.

14 MR. PARKINSON: Thank you.
15 I could go over it, I could just give it to you in writing.
16 Which would you prefer?

17 MR. BOUCKHOUT: It makes no
18 difference to me. I'm sure Doctor Hill may have a comment.

19 MR. CHAIRMAN: I believe it
20 relates to a difference between Envirocon's thinking of
21 where the pipeline could go and the preliminary analysis
22 that Foothills did when they drew the line on the map and
23 presented it to the National Energy Board. Foothills,
24 as I understand, say down slope in several places when
25 they're on the Eagle Plain and is it correct Mr. Parkinson,
26 that you're suggesting the pipeline should stay away from

1 these areas because of their terrain sensitivity?

2 MR. PARKINSON: That is true.
3 We suggest that through that area it should stick along the
4 ridge.

5 MR. BOUCKHOUT: In other
6 words, close to the highway.

7 MR. PARKINSON: That is
8 correct.

9 MR. BOUCKHOUT: That's right.
10 We have been looking at that particular portion of the
11 routing over the last several weeks and initial indications
12 are that we would probably concur with your assessments.

13 MR. CHAIRMAN: Any questions
14 for Mr. Parkinson on his presentation from the panel
15 staff? Doctor Schilder?

16 DR. SCHILDER: Mr. Chairman,
17 I have a question for Mr. Parkinson. I noticed on page
18 three there hasn't been any reference made to water quality data
19 in your statement. Would you agree that baseline water
20 quality data would be useful for that area in general?
21 I'm referring to the recent statement made by the officer
22 from the Yukon Territorial Government as well as to
23 certain details from the statement which Chief Kaye pre-
24 sented to the panel yesterday.

25 MR PARKINSON: Yes, in the
26 light of discussions and I agree this was an oversight on

1 our part. It quite clearly should be there. Yes, Mr.
2 Smith would like to make a comment.

3 MR. SMITH: By water quality,
4 I believe you mean chemical water quality and certainly
5 it is our opinion that the primary type of water quality
6 degradation that you find from water crossings would be
7 sedimentological, meaning increased sediment loads increased
8 turbidities. Chemical water quality and sources of
9 chemical water quality degradations then would be from
10 construction camps and things like this. I noticed, flying
11 over the route, that lagoon systems are being used on
12 several of the existing staging sites in construction
13 camps and perhaps the efficiency of these lagoon systems
14 could be evaluated. I don't think chemical water quality
15 degradation is a major concern however. I think the
16 sedimentological is certainly the primary factor.

17 DR. SCHILDER: Well, thank
18 you; however, I don't share exactly your same view on this
19 subject. In principal you are correct, however, in view
20 of general interest in that area and in especially I'm
21 referring to the yesterday's comments that there has been
22 some concern over mercury pollution and about potential
23 heavy metal pollution due to man activities. Especially
24 a note was made concerning mine exploration, or mining
25 activities within the area. I would recommend that it would
26 be advisable to include baseline water quality data. It's

Dr. Schilder
Mr. Parkinson
Mr. Ricker
Mr. Lister

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1 always better to act on the basics of facts and evidence.

2 MR. CHAIRMAN: Mr. Lister?

3 MR. LISTER: I have a question
4 for Mr. Parkinson or perhaps Mr. Ricker. A 1972 report
5 prepared for the Department of Public Works by Schultz
6 Consultants, cites negative impacts of gravel removal
7 along the Klondike, Blackstone, Ogilvie Rivers, on the
8 fishery resource, due to the requirements of gravel for
9 the construction of the Dempster Highway at that time.
10 There is apparently a shortage of suitable gravel outside
11 the flood plains of those rivers and in some cases, even
12 within the active channel of those rivers.

13 Pipeline construction would
14 presumably require more supplies of gravel. Is it, in
15 fact, essential to go to sources within the stream channel
16 for gravel in that area?

17 MR. PARKINSON: I'll ask
18 Mr. Ricker to speak to that please.

19 MR. RICKER: There's no
20 denying the fact there is an aggregate problem north of
21 Chapman Lake right through to the end of the line, but,
22 we're still within limit of glaciation. There are minor
23 glacial sluvial (?) hummocks of gravel available and on
24 the Blackstone route I would expect to find these to the
25 point where they begin their climb up and over the load
26 broad pass to Soldier Creek and then I expect they're going

1 to run out of that sort of source.

2 Another source is where fans
3 issue out of the side tributaries. When the water level
4 drops, a great portion of the active fan is exposed and
5 I would suggest that they stock-pile gravel from these
6 areas at times when the water is low and stay away from
7 them when the water is high and a much amount of gravel
8 can be made available this way. Up on the ridge along the
9 Eagle Basin, the problem is distance and I notice over
10 on the MacKenzie Valley side of the Dempster they have
11 made huge rock quarries to develop in situ crushed
12 rock supplies. They find that to be the most economical
13 approach on the ridge of Eagle Plain where the sandstone
14 is near the surface. It's not always present but it's
15 present often enough to consider this as a source and I
16 would prefer, myself, a deep bit removal rather than a
17 broad lengthy scraping of the ground to ravel up some
18 supplies of lag rock, the latter being far more
19 extensive in damage.

20 I rated that whole rim of
21 Eagle Basin impact four as far as gravel situations are
22 concerned and there's no doubt about it, I think they're
23 going to be faced with a rock pressure quarrying operation
24 to draw up some of their supplies. I think they'll find
25 it the most economical.

26 Along the west slope of the

1 Richardson Mountains, if the pipeline is up on the first
2 flat irons, as it's referred to in literature, I
3 think enough material is available as loose rock on the
4 ground to meet their demands, if they go through the
5 exercise very carefully. I could be wrong but that was
6 my impression when I overflowed the area and certainly it's
7 much drier up there and there's much more rock exposed,
8 but again, you're faced with the problems of broad scraping
9 perhaps to develop supply and if that's the case, well,
10 then they'll be forced to go back to the rock pit situation.

11 In summary, I think there's
12 a fair amount of gravel available in the rivers and fans
13 themselves. At times when the water levels are low and
14 they can work away from the edge of the water to stock
15 pile supplies, otherwise, you better keep them out of there,
16 I think, in view of the fishery situation.

17 MR. LISTER: Thank you. I
18 just wonder how acceptable that practice of removing gravel
19 from within the active channel would be to fisheries
20 people.

21 MR. PARKINSON: I think I
22 can answer that by saying it's unacceptable.

23 MR. LISTER: Thank you.

24 MR. CHAIRMAN: Mr. Klassen?

25 MR. KLASSEN: Dr. Hoefs has
26 a comment on the last submission.

1 DR. HOEFS: Mr Chairman, this
2 is just a comment not a question. I think Mr. Parkinson
3 said that when it comes to caribou, we are primarily con-
4 cerned about interference with migration across the road
5 and I think that the panel should be made aware of the fact
6 that we're also dealing with perhaps interference with
7 winter range use. The entire southern half of the
8 Dempster, perhaps from mile one fifty south to mile forty is
9 part of this population's winter range so we are dealing,
10 when it comes to winter range use, we are dealing with
11 a five to six month period which may be much more difficult
12 to accomodate when it comes to timing construction,
13 timing highway use, compared to the actual interference
14 with migration which is only about two to three weeks in
15 the fall and in the spring. Thank you.

16 MR. CHAIRMAN: Thank you.
17 Any more questions from panel staff? Any questions,
18 comments from the floor? Mr. Bouckhout?

19 MR. BOUCKHOUT: Just one
20 further question on the water quality topic for Mr.
21 Parkinson. I wonder if you could tell me, given that's
22 the normal method of monitoring the effects of water quality
23 might be simulatenous sampling up and down stream from an
24 activity site, how much and for what purpose you feel
25 water quality data might be required with respect to
26 pipeline potential impact.

Mr. Parkinson
Mr. Smith
Mr. Bouckhout
Mr. Lyons

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1 MR. PARKINSON: I think Mr.
2 Smith is probably better able to talk to you on the
3 technicalities of that question.

4 MR. SMITH: I don't believe
5 it's necessary at all. I don't see how a pipelining
6 activity is going to be a source of trace elements to a
7 system. You've got a couple of potential things, you've
8 got sewage effluent, which can be probably treated if it's
9 done well. By a lagoon system , by chemical toilets in
10 small camps; there are a number of viable methods. You've
11 got hydro-carbons from storage sites, things like this
12 which could be potentially spilled in rivers. Besides
13 gross negligence, I think this is certainly not a major
14 issue.

15 MR. BOUCKHOUT: Thank you.

16 MR. SMITH: Perhaps you
17 would like to talk to Doctor Schilder about that. I think
18 it was his question not mine, that you were addressing
19 that second question to.

20 MR. PARKINSON: I would
21 just expand slightly on what Mr. Smith has said and just
22 suggest that with proper treatment of line testing fluids
23 that the risk of contaminating water is quite small.

24 MR. CHAIRMAN: Mr. Lyons
25 would like to comment.

26 MR. LYONS: I have one comment

1 I would like to make about water quality. We have a concern
2 that the trenching may break into some ground water in
3 some areas, cause a flow through some sort of material
4 that has some natural trace elements and bring this into
5 the stream where it is not now getting in there and I think
6 we should look into what's in the ground along the trench
7 for this sort of thing.

8 MR. CHAIRMAN: Mr. Bouckhout?

9 MR. BOUCKHOUT: Would you
10 hazard to put any kind of a probability on that?

11 MR. LYONS: No.

12 MR. CHAIRMAN: Okay are
13 we through with the -- oh, Doctor Hughes?

14 DR. HUGHES: I just wanted to
15 make the comment that throughout much of the Yukon there
16 have been massive geochemical studies both by the geological
17 survey of Canada, by private industry, these are just a
18 sampling of water, soils and stream sediments. The data aren't
19 quite of the quality that perhaps water quality people
20 would regard as adequate, but the body of data is massive
21 and shouldn't be overlooked in any attempt to develop
22 base line data on what might be called, natural levels,
23 of metals in the streams.

24 MR. CHAIRMAN: Any other
25 comments. We'll move then, to our next advisor. Mr.
26 Ricker.

1 MR. RICKER: I would just like
2 to make a few comments, which, inadvertently, slipped by
3 me. The problem of paralleling the North Klondike River
4 and Blackstone Rivers. The North Klondike, the terrain
5 alongside of it, by and large, has a very heavy moss cover
6 and if a pipeline is upslope from the road, I can't
7 visualize paralleling the river, is the problem, I think,
8 crossing all the streams feeding the river is more of a
9 problem.

10 With the Blackstone, possibly,
11 the alignment may force in near the river and I can
12 modify my view on that but that's the same sort of thing
13 there where the tundra is thick and extensive. There's
14 a great buffer zone between that and the river usually.
15 This has been my experience in the area, by and large,
16 it's the crossing the streams that feed the river I think
17 is the real crux of the issue on that argument.

18 Going on to impact statement
19 on the Dempster after completion. Already people are
20 beginning to work along the Dempster Highway assessing
21 what's happened to date. One such study by Poufaff(?) et al
22 and I/^{may have}pronounced the name wrong, is a Mackenzie Valley
23 report which lists some of the geotechnical problems they've
24 seen to date, and I would suspect that this highway's
25 going to be heavily monitored by many interested citizens
26 and institutions in the next one or two years in view of

1 the advertisement about it's presence and effect of the
2 gas line.

3 This brings me up to my big-
4 gest issue is that the Dempster Highway passes through,
5 parallels the Eagle Plain Gas Basin. If the gas line is
6 indeed a reality you cannot help but speculate that the
7 oil companies will go back into Eagle Basin looking for more
8 gas reserves. They already have a few capped gas wells
9 in the area and they have one or two marginal oil wells.
10 I'm not sure what the reserves are. I've not been able to
11 see a figure. I've asked but none have been forthcoming.

12 However, while I worked on
13 the Yukon Resource Atlas, I made a mental note whenever
14 I could to keep track of all the large anticlinal struc-
15 tures which could be hydrocarbon bearing.

16 There are many anticlinal
17 structures in the northern Yukon, in the Eagle Plain
18 Basin in particular, which have yet to see the drill, and
19 so, I am willing to bet that the oil companies are sifting
20 through their files thinking over what their plans will be
21 once the gas line is there, so we are definitely going to
22 have auxiliary impact if the gas line is built.

23 One final comment about the
24 mercury at Old Crow. I would suspect the source is
25 probably somewhere in the mountains and I think if we can
26 have a look at our true cathrose(?) mineral file we may be

1 able to get to the crux of the situation. It was just
2 a guess on my part, I could be totally wrong.

3 MR. CHAIRMAN: Thank you
4 Mr. Ricker Any more comments? I'd like then, to move
5 down the table to Mr. Klassen.

6 MR. KLASSEN: Mr. Chairman,
7 yesterday Chief Kaye and Gnafton Njootli raised some questions
8 that I wasn't able to answer satisfactorily, so far as I
9 was concerned. Today I spoke to our senior conservation
10 officer, and this was the question that Mrs. Archibald
11 raised, on the problem of natives from Fort MacPherson
12 coming into the Yukon to hunt and then taking their take
13 back to the NWT and selling it. This apparently is the
14 case, it does occur. However, the Yukon Act prevents the
15 Territorial Legislature ^{here} /from legislating the hunting of
16 natives and since they have this traditional right to
17 hunt in the Yukon, although they are residents of the
18 Northwest Territories, there is nothing that the Yukon
19 Wildlife Branch can do to prevent them from hunting over
20 here and once the game which they can legally take is
21 removed from the territory, it is outside of our juris-
22 diction and it is legal for them to sell game in the
23 Northwest Territories and so they do, apparently.

24 This is a matter which is
25 being taken up with the Northwest Territories enforcement
26 people, but how it will be resolved, we don't know.

I do not have a brief as such,

1 on concerns on the Dempster except to point out to you
2 that section of our overall brief that we presented
3 to you beginning on page one hundred and twenty three.
4 We outline our concerns as we now see them concerning
5 the possibility of a Dempster Highway lateral.

6 Briefly, we are concerned
7 there about the lack of insufficient research conducted
8 to date on the caribou, grizzly, and falcon populations
9 in the area. Our estimation is that three to five years
10 will be necessary to provide us with the information
11 that we feel will be adequate, and, in our brief we say
12 that federal funds have been requested, or federal aid
13 has been requested in carrying out this research and I'm
14 happy to report that just recently, between the time that
15 we typed up the brief that you now have and today, funding
16 has been approved for two one year studies, one in
17 connection with sheep in the Richardson
18 Mountains and one in connection
19 with falcons in the Dempster Highway area.

20 That is all that I have to
21 say about the Dempster Highway. Dr. Hoefs is here to
22 answer any questions that the panel or other participants
23 may have about our concerns there.

24 MR. CHAIRMAN: Thanks very
25 much. Do the panel have any questions? Could you briefly
26 describe to us, the activities that are taking place with

1 regard to management with relation to the highway game
2 management, when, you know, what are your target dates for
3 a plan of management, what's entailed, what are the
4 variables, and so on.

5 DR. HOEFS: I think it is
6 known that considerable work has been done on these caribou
7 by the Canadian Wildlife Service and by consulting firms,
8 many in the northern Yukon, in relation to proposed pipe-
9 lines there and some of that work was extended to cover
10 the winter range and there was also some work done of
11 caribou reaction to traffic and to hunting but that work
12 was very limited, I think it was limited to just one
13 hunting season.

14 And our Game Branch hunter
15 checkstations for the past five years so we know, roughly
16 when the caribou appeared on the highway and how many
17 were shot every year, but as far as actively getting
18 involved with research is concerned we only got one man
19 year last year or the crown fiscal year. We hired a
20 person last September and he has left us in the meantime
21 and we are presently again, trying to fill the position.

22 We have done some work on the
23 highway this winter but it takes a person who comes up
24 here for the first time quite a while to get on the ground.
25 There's a lot of literature available and he hasn't really
26

1 done that much this winter except we have monitored, as I
2 mentioned, the hunting activities, and the use of the
3 highway right of way and the winter ranges around the Demp-
4 ster this last winter. And as I mentioned yesterday we
5 know that the caribou have been there more or less con-
6 tinuously from late October to almost late May.

7 We will be doing some work
8 in the Northern Yukon this summer because it's necessary to
9 monitor the population as a whole if we want to assess the
10 impact of the highway we have to keep track of the total
11 numbers, the recruitment rate, the other mortality factors
12 besides hunting, otherwise we will never know what effect
13 the highway had on them and we will go into more detail
14 along the highway next winter. We have also asked for
15 federal funding and, as I mentioned, as Bill mentioned,
16 we obtain federal funding for the sheep and for the falcon
17 work, and we are pretty optimistic that we will get some
18 funding from Ottawa, also for the caribou herd next winter.

19 And the question was raised
20 yesterday about the involvement of native trainees and
21 in this proposal we sent to Ottawa we suggested that
22 we would employ up to three native trainees for the
23 Dempster study. Hopefully one from Old Crow who can later
24 be used in a prominent position in Old Crow and one from
25 somewhere from the Dawson area who will be used there,
26 subsequently and we hope that the NWT Government gets

1 involved and supplies one man year from the MacPherson
2 area who will get involved in the study to monitor that
3 portion of the highway and who will subsequently be taken
4 on as a permanent staff member for the NWT Game Branch.

5 That's it essentially.

6 MR. CHAIRMAN: Thank you.

7 There's one obvious question in this that I feel obliged to ask
8 everyone, and that is that given the highway and given
9 range management methods are applied to regulating highway
10 traffic at critical times, and given that the pipeline
11 could be constructed when the caribou weren't there, what
12 could be the effect on the caribou of constructing and
13 bearing a pipeline?

14 DR. HOEFS: I don't think

15 I can answer that question. I mentioned that as far as
16 the portion of the highway which is presently completed
17 is concerned, the caribou are not in the area from, let's
18 say the first of June, all the way to the end of September
19 and I don't think that construction at that time would
20 interfere with the caribou directly. There may be some
21 interference with winter range if fires occur and these
22 things, but there will be no direct interference at that
23 time. Of course, if transportation happens at other times
24 when they are there, there will be interference by the
25 trucks bringing up material.

26 MR. CHAIRMAN: I guess the

1 other assumption I missed, was assuming also that the truck
2 related traffic, well, any related traffic on the Dempster
3 Highway, any traffic related to the pipeline construction
4 would obey the same rules as the other traffic.

5 DR. HOEFS: That's right, in
6 our submission we would have liked to see perhaps no
7 traffic at all until we know more about the behavior of
8 caribou and at least not during the winter months.

9 MR. CHAIRMAN: Right. I
10 don't know what the possibility of that is, not being inside
11 the Dempster Highway debate, but is there a possibility
12 that the traffic would be curtailed for long periods of
13 time?

14 DR. HOEFS: Well that is not
15 up to the Game Branch. We tried some years ago to impose
16 restriction on speed and we didn't get to square one with
17 it.

18 MR. CHAIRMAN: Okay, Mr.
19 Chambers has a question.

20 MR. CHAMBERS: Dr. Hoefs
21 are you saying, I am interpreting right that there is
22 a wintering area on the Dempster. I think you said
23 something from mile forty to one twenty, or something,
24 I'm not sure of the figure.

25 DR. HOEFS: No, well, it
26 depends on the winter, you know, there are winters when

1 they are all the way up to Old Crow, but, in general, the
2 Ogilvie Mountains, the Wernecke Mountains and the area
3 extending west into Alaska are the known winter range of
4 that herd and about one third of it would be cut off by
5 the highway, it is east of the highway so if we cannot
6 maintain the migration across the highway then they would
7 lose one third of their winter range.

8 MR. CHAMBERS: Following
9 that up then, it seems that there is some difficulty here
10 in finding a construction window which time, if you're
11 talking about tundra type of sensitive area terrain to work
12 on which you might be suggesting winter construction
13 because of that sensitivity, that you just don't have a
14 construction window on part of that highway. Is that a
15 fair assumption?

16 DR. HOEFS: That's right, yes.

17 MR. CHAIRMAN: Okay, Mr.
18 Wykes.

19 MR. WYKES: In your brief
20 of July the seventh, page one twenty six, you refer to
21 their being six registered trap lines between miles zero
22 and one seventy of the Dempster Highway and then you refer
23 to in capital letters an Old Crow group trapping area from
24 mile one seventy to the NWT border. I was wondering if you
25 could tell us what the status is or the significance of
26 that Old Crow group trapping area?

1 DR. HOEFS: Just a moment.

2 I don't think our furbearer analyst is here. I'll just try
3 to explain it. We have for three villages, we have group
4 trapping areas. One is Old Crow on is McPherson and one
5 is Ross River. The remainder of the Yukon is divided
6 up into registered trap lines for individual trappers and
7 the, if I'm right, the Dempster Highway goes through in-
8 dividual trap lines around the southern section. Then it
9 goes into the Old Crow group area and then the last section
10 would be in the McPherson group area.

11 MR. WYKES: So nobody else
12 is allowed to have a registred trap line in that particular
13 area, from mile one seventy in the Dempster to the NWT
14 border.

15 DR. HOEFS: That's right
16 and maybe, I don't know off hand if there's any lines open
17 right now, but they're all registered lines, yes.

18 MR. WYKES: Thank you.

19 MR. CHAIRMAN: How feasible
20 is summer construction on the tundra in the Dempster area?
21 Mr. Bouckhout, would you like to answer that?

22 MR. BOUCKHOUT: Well, that
23 would depend on a number of elements. One of the primary
24 ones being the ice content of the permafrost in that
25 particular area. Of course, a good portion -- there may
26 be a possibility that some method could be worked out in

1 order to undertake summer construction in particular areas.

2 It bears not only on the ability to construct, but also
3 very heavily on the economics, depending upon what method-
4 ology one had to use to construct and what length of
5 the line would have to be constructed in the winter time--
6 or the summer time rather.

7 MR. CHAIRMAN: Mr. Trevor?

8 MR. TREVOR: You mentioned
9 a few minutes ago Mr. Bouckhout that you were tending now
10 to accept the idea that crossing the Eagle Plain area,
11 as we call it, and even on up into the lower reaches of
12 the Richardson's, you would agree that the construction
13 could take place, virtually up against the road. Is that
14 correct? That would be the best routing?

15 MR. BOUCKHOUT: In our
16 current thinking Mr. Trevor, given the location of the
17 highway, that's one of the reasons that we are re-looking
18 at it and this, of course, is a very preliminary stage,
19 but the indications now from, not only our environmental
20 personnel who have been in the field -- were in the
21 field for a week or two, and as well as our construction
22 personnel, that having looked at it again it would
23 appear.

24 that the preferred option could very well be close to the
25 highway as opposed to the initial routes or corridor, call
26 it whatever you may, that was described for the purpose

1 of feasibility and economic studies.

2 MR. TREVOR: Let's take that
3 a step farther then. Given that that is likely to be an
4 infrequently travelled road at times of the -- given the
5 fact that it's above the tree line, given the fact that
6 we want to keep the corridor as narrow as possible, what is
7 the feasibility of actually using the road to work from?
8 In other words, your machinery would actually work off the
9 road except for the digging of the ditch and you could
10 have the pipeline virtually in the same situation as we
11 were talking about at Sheep Mountain, but for virtually
12 the length of the highway.

13 MR. BOUCKHOUT: I will turn
14 this over to Mr. Kosten for his comments from our con-
15 struction man's point of view. I would say just initially that
16 of course, it has design implications. We spoke earlier of
17 the requirement for heavy wall pipe within a highway
18 right of way, and I would suspect that if we had to do a
19 heavy wall pipe stretch that the economics would be
20 pretty suspect.

21 MR. KOSTEN: If I might
22 comment on that. The routing of the road area, or let's
23 say the configuration of the road, if the road had been
24 put ⁱⁿ a reasonably straight line, the feasibility of
25 following the highway around at every bend, so to speak,
26 or virtually alongside, it is technically possible, but it

1 would effect the feasibility from an economic standpoint
2 to, essentially, parallel the road. I think what we would
3 suggest is that we could reroute it to the vicinity of the
4 highway, but I would not like to see a stipulation that
5 we must parallel the road around every bend, so to speak,
6 because of the nature of the highway itself. It's very
7 winding and it would add considerable length if you had
8 to essentially parallel the road alongside or within a
9 certain distance.

10 I might add that the current
11 routing that we have looked at, the general criteria for
12 a pipeline is to try and keep it as short as possible and
13 this governs our initial look at it. I was up on Monday
14 and flew it again and generally speaking, where the highway
15 is located, the terrain is such that it's quite favourable.
16 It does add length to the proposed length of line that
17 we have looked at.

18 MR. CHAIRMAN: In general,
19 by following the highway, are you minimizing the ice rich
20 soil situation. Would you care to comment?

21 MR. KOSTEN: I would suspect
22 so.. The highway is located on higher ground, generally
23 speaking, and I would expect that probably the routing
24 of the highway was selected with this in mind as well, so
25 I can't answer your question specifically but I would
26 expect it would.

1 MR. CHAIRMAN: Thank you.

2 Doctor Hughes?

3 DR. HUGHES: I have a brief
4 question for Dr. Hoefs. I understand that part of the
5 Dempster Highway between Fort McPherson and the divide,
6 or the Yukon NWT boundary was constructed in the winter
7 time. Was any of this construction in an area occupied
8 by caribou and if so, was there any study made of the
9 effect of caribou on -- by the truck traffic and the
10 blasting and whatever else accompanied the highway
11 construction?

12 DR. HOEFS: I'm not aware
13 of any studies being done, but that area is part of the
14 Porcupine Range. One of the traditional migration roads
15 is down the Richardson Mountains and the area you refer
16 to is the area where the McPherson people do their hunting,
17 and from what I heard, they did use that road to hunt.

18 DR. HUGHES: Is it possible
19 to go back now and find out whether there were any actual
20 contacts between caribou herd and the construction operation
21 and to reconstruct what the impact may have been?

22 DR. HOEFS: I don't think I
23 can answer that question. If there's no trained person
24 at the site to keep surveillance over these things, the
25 data you get are not very useful. We know from some
26 construction people that are involved in the construction

1 north of the Eagle right now that caribou came by there.

2 DR. HUGHES: When is the final
3 section of construction scheduled. Is that summer or
4 winter?

5 DR. HOEFS: Well, they are
6 working north of the Eagles right now and the last segment
7 was up for bids and I don't know when it will be constructed,
8 but the highway is supposed to be open in '79.

9 DR. HUGHES: Is it possible
10 that that last section could provide an opportunity for
11 study of the interaction of caribou migration and heavy
12 equipment?

13 DR. HOEFS: Oh yes, that
14 will be part of the things we want to do, yes.

15 MR. CHAIRMAN: Any questions
16 from any advisors? Mr. Parkinson? Okay, any questions
17 from panel staff? Mrs. Archibald?

18 MRS. ARCHIBALD: I just have
19 one question for Doctor Hoefs. Has there been an increase
20 in hunting pressure on the Porcupine herd in the last few
21 years as a result of the Dempster Highway being put through
22 there?

23 DR. HOEFS: No. I haven't
24 got the statistics with me but last year was a relatively
25 good year but the number shot are insignificant if you
26 compare to the population size. You know, last year we

1 had a harvest of two hundred fifty to three hundred and
2 prior to that the last good year was '71. There was about
3 the same number shot and in between the four years it wasn't
4 all that much, particularly '74 and '75, very few were shot.
5 Only thirty or forty because they didn't come down in
6 time or one year they didn't come to the Dempster at all,
7 they stayed in Alaska.

8 No, the harvest along the
9 Dempster is very small compared to total harvest. Most of
10 the harvesting is done by native villagers and Arctic
11 Village Alaska, Old Crow and McPherson-Aklavik, and they
12 may take, you know, three or four thousand a year depending
13 on how close they get to the villages. So we were
14 not so much worried about the numbers shot on the Dempster,
15 we are more concerned about the fact that they are shot in
16 a very short time period and very concentrated.

17 MRS. ARCHIBALD: I see.

18 Thank you.

19 MR. CHAIRMAN: Doctor Schilder?

20 DR. SCHILDER: Mr. Chairman,
21 I have a question for Dr. Hoefs. Yesterday we had a
22 brief from Mr. Daniel Noland. I guess you were present.
23 Would you agree in principle with the content of the brief?

24 DR. HOEFS: I agree with --
25 I don't remember everything he said, but I agree with the
26 statement made that it is the combination of traffic and

1 hunting which may turn the caribou off and I agree with
2 the examples he used from the National Park, that the
3 animals can get used to traffic and we have examples from
4 Banff and Jasper and even from McKinley. That the traffic and
5 the people don't disturb them as long as there's no hunting
6 associated with it.

7 DR. SCHILDER: If I could,
8 Mr. Chairman, I have another supplemental question for the
9 chief construction department from Foothills. We have
10 already been several times in their discussion where it
11 would be the best to have a pipe in relationship to the
12 highway. My question would be, what would be your estimate
13 concerning increased cost in construction if the pipeline
14 would follow, or, more or less, would copy a route of
15 highway?

16 MR. KOSTEN: We haven't tried
17 to put any numbers on that. It would be relationship of
18 total length. I don't know, what is the highway mileage,
19 do we -- that's what you're looking at. I don't have those
20 figures. As far as the relative cost is concerned, it's
21 a question of proportionate length. The pipeline mileage
22 as we have it routed now is about seven hundred and thirty
23 eight miles. What the highway mileage is I don't know, so
24 it'll be a factor on a proportionate basis. I can't give
25 you specific figures on that.

26 DR. SHILDER: It's my

1 recollection also that from your side I heard, if I under-
2 stood properly that there would be a significant difference
3 in costs because of the thickness of the pipe. Would the
4 thickness of the pipe cause a significant difference in
5 the total construction cost?

6 MR. KOSTEN: Well, the
7 relationship of the cost of the pipe to the cost of
8 construction, the pipe is actually the more expensive.
9 It's about a forty-sixty relationship. Sixty being the
10 steel, so if you increase the wall to wall thickness it
11 does start becoming significant, yes.

12 DR. SCHILDER: I see. But
13 would you also agree that there would be certain pros
14 and cons, I mean advantages as well as disadvantages?
15 There would be certainly some benefits and some potential
16 savings in terms of land use, in terms of access, in
17 terms of maintenance. Would you agree that it would be
18 worthwhile, still, to have a look at a concept of routing
19 a pipeline as it may be related to the highway?

20 MR. KOSTEN: Well, if you're
21 talking about, you know, sticking a pipe right immediately
22 adjacent to the road, in other words, as part of the road
23 bed itself, which, if I'm interpreting your question
24 correctly, I doubt that the NEB code would permit you to
25 do that for the total length of the highway. They do get
26 a little dicy about being near such a facility or within

1 you know, the shoulder of the road and so forth. As far
2 as land use is concerned, the actual width that you need
3 for the pipeline that we would be -- that we've been looking
4 at which is about a thirty inch, you're looking at about
5 a sixty foot right-of-way, sixty five feet. Something of
6 that order. Now, if you put the pipeline right-of-way
7 immediately adjacent to the road it wouldn't effect the
8 land use because ultimately, what you're looking at is
9 sufficient room to construct a line plus the width that
10 you require for the actual pipe itself which is four or
11 five feet.

12 I think what we're leading
13 to here is what additional costs in terms of the present
14 relative cost if you put it alongside, say, one hundred
15 feet away or something like that, you won't increase the
16 cost of the steel because at that distance you wouldn't
17 need any heavy wall pipe. Your right-of-way width is
18 going to be the same. You need enough room to construct
19 it and this is simply a fact of life, but you need sufficient
20 room for equipment to go through.

21 The major cost there is going
22 to be the increased length and I've heard figures here
23 where, from an environmental standpoint the length makes
24 a difference, so if you increase the length and presumably
25 based on the criteria that these people have put forth
26 here in the last couple of days, you're environmental

1 impact is going to be greater the longer your line is.

2 DR. SCHILDER: Only the last
3 question if I could still have your patience. But, this
4 panel is concerned with environmental concerns or questions
5 or problems and with environmental costs, and would you
6 agree that from that point of view it has some merit, at
7 least within a very environmentally sensitive areas as
8 perhaps we may have, let's make an example, a ridge between
9 the Canada/U.S. boundary to the western bank of the White
10 River where the proposed pipeline route is cutting very
11 ice rich permafrost, it will be, well, from the point
12 of view of potential environmental interest and problems
13 implied by which your technical information, would be safer
14 to have a simply the route as close as possible to the
15 highway.

16 MR. KOSTEN: If you have a
17 straight line. I'm referring here to the Dempster. If
18 you have a reasonably straight highway then there are
19 certain advantages from the standpoint of access because
20 this is very important. Access to a project such as this
21 is important, and I guess this is one of the basic reasons
22 that we attempted to follow the Alaska Highway in that
23 application.

24 DR. SCHILDER: Thank you
25 Mr. Chairman. I'm sorry if I were partly out of order.

26 MR. KOSTEN: I might comment

1 that the relative cost figures, if this is of interest to
2 the panel, that we could undertake to give you some idea
3 of comparisons. I don't have them in my head.

4 MR. CHAIRMAN: Any comments
5 questions from the floor? Dr. Lacate has a question.

6 DR. LACATE: I missed that
7 figure you gave on cost again. Perhaps we could phrase
8 it a different way. What is the cost of regular pipe and
9 what is the cost of heavy wall pipe. Just piece by piece,
10 or mile by mile. Is heavy wall fifty percent more, a
11 hundred percent more.

12 MR. KOSTEN: I'd have to
13 undertake to supply that for you. I don't have the figures
14 off the top of my head. I'm sorry.

15 DR. LACATE: You mean you
16 haven't purchased pipe over the last few years, or you
17 don't have the figure?

18 MR. KOSTEN: Well it depends
19 on the diameter of course.

20 DR. LACATE: Well what are
21 you proposing to use?

22 MR. KOSTEN: The thirty inch,
23 I think it was -- the cost of the forty eight that we
24 propose on the Alcan or whichever routing is being costed,
25 it would be something of the order of six hundred and
26 fifty dollars a ton and pipe is normally bought on a tonnage

1 basis. You'd have to convert that to feet. I don't have
2 the figures off the top of my head. I think it's something
3 of the order of ninety dollars a foot for the forty eight
4 inch pipe.

5 DR. LACATE: That's the
6 regular --

7 MR. KOSTEN: Our regular
8 line of pipe which is .54 wall thickness.

9 DR. LACATE: And then the
10 heavy, what is the figure on that?

11 MR. KOSTEN: Heavy would be
12 probably a variation of, oh I guess, ten to fifteen percent.
13 Something of that order.

14 DR. LACATE: Now, if I recall
15 correctly, you may correct me on this, you were planning
16 to use heavy wall pipe in the Beaver Creek area where the
17 pipeline was chilled. Is that right? I believe the first 40 miles

18 MR. KOSTEN: It is heavier
19 wall pipe, yes. It's .60 wall thickness where --

20 DR. LACATE: That was because
21 of the permafrost?

22 MR. KOSTEN: That's where
23 it's chilled, yes. If you -- river crossings, for instance,
24 any major river crossings would also have heavier walled
25 pipe. It's something of the order of .7 wall.

26 DR. LACATE: So then on the

1 Dempster Highway you're in a permafrost area. Would you
2 not already be going to heavy wall pipe?

3 MR. KOSTEN: It's purposed
4 to be all chilled, yes. I believe the wall thickness for
5 thirty inch is .386.

6 DR. LACATE: So we may have
7 a possibility of already going to a heavier wall pipe
8 just because of the permafrost.

9 MR. KOSTEN: Well, you'd
10 have to go heavier because of your proximity. If the
11 examples we were talking about with Dr. Scholder, your
12 code requires you under certain circumstances to go to
13 heavier wall pipe than what your normal main line is. So
14 this is governed by the code. For instance, if you're
15 passing through a heavily populated area, you have to go to
16 a heavy wall pipe.

17 DR. LACATE: Thank you.

18 MR. CHAIRMAN: Before we lose
19 this topic of construction in that area. What sort of
20 a study would you have to undertake to determine the
21 feasibility of summer construction. Presumably it would
22 be a matter of gravel pads and this type of thing. What
23 would be involved in determining if summer construction
24 would be feasible?

25 MR. KOSTEN: Well, it depends
26 on your soil condition. For instance, the recent practice

1 in the industry, for instance, where you are in swampy
2 ground, it becomes a matter of economics to construct in
3 those areas in the winter time where you have frost
4 penetration and it holds your equipment up. If your soil
5 conditions were such in permafrost that you didn't have a
6 high ice content, then that would be quite feasible to
7 construct in summer, I believe. It would also, and I'm
8 saying here even without a gravel pad if you're into
9 tundra and we had environmental restrictions in that
10 context, then this would be probably an overriding factor.

11 The third one, of course, is
12 the gravel pad concept, Alyeska line, which was all con-
13 structed in summer off the gravel pad; but that gets to be
14 very costly, because it also uses up a lot of gravel, of
15 course. It would not be an extensive, to give you an order
16 of magnitude figure, we could come up with those fairly
17 quickly, it's a fairly simple exercise. It's a matter
18 of costing out your materials and so forth for that sort
19 of situation.

20 MR. CHAIRMAN: So presumably
21 as part of an environmental impact statement on the Dempster
22 route it would be feasible to include different con-
23 struction techniques which would be possible in the summer
24 so that one could stay away from the wintering caribou.

25 MR. KOSTEN: It would be
26 possible, certainly.

1 MR. CHAIRMAN: Thank you.

2 MR. KOSTEN: And it would be
3 feasible.

4 MR. CHAIRMAN: Okay. I think
5 we'll break for coffee now and return. We lost Mr. Surrendi
6 so we'll hear from him next.

7 (PROCEEDINGS ADJOURNED)

8 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

9 MR. CHAIRMAN: It became
10 clear that the panel would be involved in listening to
11 information on the possible Dempster link. A paper was
12 brought to our attention co-authored by Mr. Dennis Surrendi
13 which described some characteristics of the Porcupine
14 caribou herd. We therefore asked Mr. Surrendi to come to
15 our hearing and assist us in understanding better the
16 Porcupine caribou herd with relation to the highway and
17 possible pipeline. Mr. Surrendi?

18 MR. SURRENDI: Thank you
19 Mr. Chairman. I would like to preface my comments with
20 a few points, if I may. First of all, I'm here because
21 first of all of an invitation from the panel, which I am
22 most gratified to receive; and secondly, by absolute sheer
23 coincidence that I happen to work in a geographic area on
24 a wildlife population that would become fairly reknowned
25 in the public's eyes as far as their interest with respect
26 to both highway and pipeline developments. So please do

1 not consider me the world's authority on all caribou
2 populations. I might just add as well that the focus of
3 what I have to say will be on the Porcupine caribou herd
4 and on the Dempster option which is being discussed for
5 a pipeline. I might just point out as well that this
6 particular population is under the jurisdiction of both
7 the Yukon and the Northwest Territorial Governments, and
8 I certainly am not here to speak on their behalf and I
9 acknowledge that jurisdictional role. In addition, as
10 well, Alaska, of course, is involved.

11 I might add that all work that
12 was done was only carried out through and feasibly done
13 through the cooperating efforts of both of these governments.

14 I have with me two individuals
15 that I hope will be able to repond to questions along with
16 myself and they are Dr. Don Thomas, who is what I consider
17 to be one of the true caribou biologists and fairly
18 well reknowned internationally. I also have Mr. Malcolm
19 Dennington with me who is a biologist with the Canadian
20 Wildlife Service in Whitehorse, that has some intimate
21 knowledge of the Dempster and that particular part of the
22 country.

23 With that I'm going to read
24 a presentation which was prepared jointly by myself and
25 with the assistance of Mr. Dennington and Dr. Thomas.

26 Within the past few decades

1 caribou comprising the Porcupine herd have been the subject
2 of several survey and research projects. These initial
3 efforts were directed towards simply determining the general
4 geographic distribution of the herd, and it was only after
5 Northern Pipeline studies started in the early 1970's, that
6 the question of impact of industrial activity upon the
7 integrity of the caribou herd became a subject of field
8 investigations. Even so, a lack of data at the onset of
9 pipeline programs dictated that studies be directed towards
10 distribution, migration routes, chronology of seasonal
11 activities, general behavioral characteristics and population
12 numbers.

13 As a result of these studies
14 we now have a reasonably comprehensive over view of the
15 current status of the herd. But there are still unanswered
16 questions with regard to how the information can be applied
17 in assessing the potential effects of developments.

18 If the parameters studied
19 are relatively static then, when fully understood, they can
20 serve as a base line for impact assessment and monitoring
21 over an indeterminate period of time.

22 On the other hand, if the
23 parameters investigated are dynamic and indeed an inter-
24 pretation of the literature suggests some extreme variations
25 within and among caribou populations, then the data assembled
26 must be viewed as applicable only to the study period.

1 To complicate matters further,
2 the ecological requirements and behavioral characteristics
3 of caribou populations that determine the degree of adapt-
4 ability inherent to within the individual caribou and within
5 the herd relative to environmental changes have been given
6 only initial and cursory examination to date. The urgent
7 need to develop a better understanding of these
8 requirements and behavioral traits stems from the recorded
9 declines in caribou population numbers on ranges that
10 have been subject to human intrusion, in the form of
11 transportation facilities and industrial developments.

12 At the outset we must realize
13 that it will not be possible to treat the impact of the
14 Dempster Highway and the potential impact of a parallel
15 pipeline as two separate causative agents. Both represent
16 changes within the range of the Porcupine caribou herd and
17 both will effect either autonomously or synergistically the
18 ecology and behavior of the caribou involved.

19 The presence of the Dempster
20 Highway, even if we assume it to be a through road before
21 pipeline construction, must not be viewed as an acceptable
22 precedent, because the road was constructed without a clear
23 understand of how and to what extent the ramifications of
24 this development would have on the Porcupine caribou herd.

25 The total effect is yet to
26 be realized. The fact that the Dempster Highway bisects a

1 major portion of the area hisorically occupied by the
2 Porcupine caribou herd places an unreasonable demand on the
3 responsible game agencies involved to rectify poor environ-
4 mental design with game management regulations.

5 I consider this a reasonably
6 onerous and perhaps impossible task.

7 Various approaches to
8 classifying the impact of pipeline development appear in
9 the literature. Some impacts can logically be expected
10 to have more immediate effect than others, and the magnitude
11 of impacts will vary greatly.

12 ultimately, our concern lies
13 with the combined effects of all introduced impacts and the
14 well being of all wildlife populations and in particular
15 the caribou populations; and categorizing the impact is
16 simply a convenient means of sifting through the cause and
17 effect metrix. For the present discussion we will view the
18 Dempster Highway and the pipeline right of way as a
19 "Development Corridor". As to our knowledge the Northern
20 Pipeline guidelines of 1972 have not been recinded and we
21 are following that concept. We will also consider the
22 effect of this corridor as it relates to caribou passage.

23 Further potential impacts will
24 be discussed as ancillary effects. It should be emphasized
25 that because no detailed engineering design exists for a
26 Dempster gas line spur, what we say must be considered

1 perhaps conjectural, due to the lack of information before
2 us relative to this proposal, and that is from an engineering
3 standpoint.

4 The possibility that a pipe-
5 line will create a physical obstruction varies depending upon
6 the design and in part, on the timing of construction. An
7 elevated line could, conceivably, present an absolute
8 physical barrier to caribou passage. Although it is expected
9 that the design of elevated lines would incorporate some
10 combination of overpasses and underpasses. A buried line,
11 which we are anticipating, would certainly minimize a
12 potential for physical obstruction, but if a gravel berm
13 was anticipated, then the height of the berm above the
14 surrounding terrain could be of concern.

15 Our experience with the
16 Dempster Highway indicates that low profile portions of
17 the road are more conducive to caribou movements or in
18 enhancing caribou movements. This probably relates directly
19 to the deterrent effect of snow drifted adjacent to high
20 profile sections of the road way, or snow plowed from the
21 road way or a combination of the two factors.

22 Finally, during the con-
23 struction period, open ditches could present physical
24 barriers of varying magnitudes depending upon the length
25 of line included in any one construction phase. Activities
26 associated with the Dempster Highway, pipeline construction

The barrier effects previously

1 outlined could influence caribou populations in a number
2 of ways. Child, in 1974, conducted experiments with
3 simulated elevated pipelines across migration routes in
4 Alaska and found different reactions within different
5 individual groups of caribou. Child found that in most
6 observations, that is greater than about eighty percent,
7 underpasses and overpasses were rejected, with caribou either
8 moving off in a direction parallel to the line or returning
9 in the direction that they approached from.

10 Guist(?) in 1975, in dis-
11 cussing the court's observations of the reaction of caribou
12 to seismic lines, suggests that lines which cause caribou
13 to be deflected from their established courses of direction
14 can have a significant impact in terms of energy expend-
15 iture. In our work, we found that fast moving heavy
16 vehicles on the Dempster Highway caused caribou to retreat
17 rapidly. In the same study, and this is quite an important
18 point, most crossings of the Dempster appear to occur at
19 night when traffic had ceased, even within no hunting zones.

20 Mr. Dennington has observed
21 that caribou approaching the Dempster may respond to an
22 approaching vehicle by racing the vehicle much as an
23 antelope in southern Canada does, having been observed to
24 do this in prairie areas. That is, they attempt to beat
25 the traffic to the crossing. A number of reports have dealt
26 with the response of caribou to aircraft overflights, and although

1 there are questions as to the adaptability of caribou to
2 aircraft noise, available evidence indicates a strong
3 potential for disturbance by low flying overflights, or
4 low level overflights. We still do not understand the total
5 consequences of this disturbance on caribou population
6 dynamics and ecology.

7 In each of these cases there
8 is a concern that caribou may be prevented or delayed in
9 reaching traditional and possibly critical ranges or be
10 subjected to abnormal energy expenditures. Effects of these
11 changes on the population may be difficult to determine.
12 For example, Guist(?) in 1975 stated that harrassing
13 stimulus is one which precipitates excitement, a physiological
14 state which is not always readily detectable externally,
15 since an individual may control it's skeletal muscles
16 while internally it's organ systems are preparing for in-
17 stant action.

18 If we assume that caribou
19 will learn to avoid areas and activites that elicit a
20 stress response, then a development corridor, which transects
21 traditional range, will certainly have a potential for
22 isolating segments of that range. It then becomes a
23 question of determining the importance of the isolated
24 areas to the overall well being of the herd.

25 The question of hunter
26 harvest within the development corridor is frequently

1 viewed as solely a management problem because control of
2 hunting activities is not within the jurisdiction of the
3 developers.

4 I previously mentioned that
5 the Wildlife Management Agencies involved have been handed
6 really, in the case of the Dempster Highway, a poorly placed
7 highway, a poorly designed highway, and they are attempting
8 to resolve some of these problems through wildlife leg-
9 islation. Regardless of where these responsibilities lie,
10 it would seem that an influx of potential resident and
11 non-resident hunters, through improved access, will require
12 regulation. This regulation should be imposed on all
13 segments of society, in view of the vulnerability of this
14 caribou population, along this corridor at certain times of
15 the year.

16 Hunting of wildlife popula-
17 tions, based on sound scientific conservation practices,
18 has never resulted in the demise of the wildlife population.
19 Past declines in caribou populations seem to be the result
20 of a combination of factors including increased human a
21 activity, fire, barriers, harrassment, natural predation,
22 etc. in addition to hunting.

23 Of all these factors, hunting
24 is one of the few that can be regulated, but it also seems
25 to be of minor importance compared to the other factors
26 if it is stringently controlled. My point here is that

1 not only hunting should be controlled. A basic principle
2 that may be accepted when planning research priorities is
3 that many questions about caribou behavior simply cannot be
4 answered within the time frame forecast for corridor
5 development. In some instances, answers may be found not
6 through research, but simply through applying the most
7 conservative regulatory measures to eliminate those
8 activities deemed most likely to have an adverse effect on
9 the caribou herd. Thus, thought should be given to re-
10 stricting or prohibiting traffic flows during critical
11 periods on the Dempster Highway.

12 Experience, to date, on the
13 Dempster, has indicated that the onset duration and mag-
14 nitude of migration in that area are not consistent from
15 year to year. There is, however, some indication that the
16 years when caribou do arrive, they use some sections of the
17 corridor more than others. A continuing annual monitoring
18 program might be combined with early efforts to better
19 delineate critical areas in order to -- in order that
20 minimum caribou disturbance and maximum highway utilization
21 can be assured.

22 These points also relate to
23 any proposed pipeline adjacent to or near to the highway.

24 In planning research priorities
25 some thought should also be given to more clearly defining
26 the south and east extremities of winter range with a view

1 toward determining if a pipeline alignment could be selected
2 to completely avoid interaction over the Porcupine herd.

3 Finally, it is imperative
4 that some formal arrangement be made among the jurisdictions
5 involved with the Porcupine herd, to develop a joint manage-
6 ment administrative unit to determine the long term research
7 requirements in management strategies for this caribou
8 population. Including an apportionment of harvestable
9 surplus among the parties involved. Such an administrative
10 unit will require international concerns to be recognized
11 as periodic harvest of the caribou population does take
12 place in Alaska, specifically at Arctic Village.

13 I don't have anything else
14 to say.

15 MR. CHAIRMAN: Thank you very
16 much. Do members of the panel have questions? Dr. Hughes?

17 DR. HUGHES: Did the period of
18 your work allow you to assess the effect of oil exploration
19 activity in Eagle Plain? It seems to be a little different
20 type of thing as opposed to a highway. There was roads
21 ramifying all over the place and becomes more aerial rather
22 than linear, although the intensity might be lower. Did
23 you have any -- I think of this because Mr. Ricker raised
24 the high probability of oil companies resuming exploration
25 if the pipeline were available.

26 MR. SURRENDI: We specifically

1 did not focus on oil and gas exploration activities. However,
2 to my knowledge there has been some effort by renewable
3 resources to focus on the implications of geophysical
4 seismic lines on the movements of caribou in the northern
5 Yukon area. In specifically forested areas, and one of
6 which was the Eagle Plain area. Excuse me, the indication,
7 as I recall the results of that, indicated that seismic
8 lines did have localized effects on the movements of those
9 animals; however, in general migrations were not altered.

10 There was one interesting
11 spin off of that particular investigation, and we witnessed
12 this ourselves, and that is that in designing a right-of-way
13 one of the things that one may have to be very cautious of
14 is the possibility of concentrations of very large numbers
15 of caribou at certain times of the year on that right-of-
16 way and possibly actually being of detriment to the pipeline
17 itself, and that is fifty thousand caribou going down a
18 sixty foot right-of-way can effectively do as much of a
19 job of disturbing the surface of that confined area as
20 a D-S Cat and we've witnessed caribou plowing through some
21 of these areas that they concentrated through up to
22 their waists in mud and I'm sure that over a period of
23 time, through erosion, that you would have exposure of
24 a pipeline in situations like that.

25 The work that we did on
26 aircraft disturbance, incidentally, was applicable to oil

1 and gas activities

2 MR. CHAIRMAN: Doctor Lacate?

3 DR. LACATE: Dr. Surrendi,
4 do you have any idea of how much of the range might be
5 isolated? Earlier today we had a figure of a third of the
6 range. Do you have any feelings of this? Does this sound
7 reasonable or are some other studies required?

8 MR. SURRENDI: I believe that
9 the estimate that was given was accurate. I think it should
10 be clearly understood that there is documented evidence and
11 historical and prehistoric evidence, incidentally, that the
12 Porcupine caribou herd can winter anywhere within the area
13 that's considered it's range. For example, during the time
14 of our investigations, the Porcupine herd wintered in Alaska
15 primarily in one occassion. The following year and the
16 year before that they wintered in what we would consider to
17 be their consistent wintering areas in Canada. Particularly
18 in the Yukon.

19 So, in essence, the entire
20 area occupied by the Porcupine herd, both in Alaska and
21 in northern Yukon could be considered as potential wintering
22 areas. However, they tend toward a movement into southern,
23 well, into Canada, the northern Yukon and the Richardson
24 Mountains in the Northwest Territories, more consistently.

25 DR. LACATE: Again, perhaps,
26 could you advise us on whether a combined corridor is more

1 of a barrier than two separate ones. In other words, if
2 a pipeline and a highway were together and there was a
3 two hundred foot swath rather than two one hundred ones
4 spaced apart, do you have any feelings or --

5 MR. SURRENDI: Well, with
6 hindsight being what it is, twenty-twenty, I think that
7 the opportunity, given, let's say this proposed spur line,
8 was a viable option, it would have been very useful to
9 consider developing the road and the pipeline outside of
10 the range of the Porcupine herd to the southeast. That
11 would then not have been a problem. My view is that the
12 implications of the combined corridor will always have it's
13 problems, particularly the fact that you don't build roads
14 or highways with the idea of abandoning them. The intent
15 is to build a road so that you can increase transportation,
16 whereas the intent of building a pipeline usually has a
17 fairly active period of time -- after which there's
18 a fairly low key, preferably by a pipeline engineer any
19 way, involvement with that pipeline.

20 So the indication would be
21 that movement along that corridor at a particular time of
22 the year will always be a problem.

23 MR. CHAIRMAN: Mr. Trevor?

24 MR. TREVOR: Mr. Surrendi,
25 we know that in the summer time there is a very definite
26 area where they congregate and yet in terms of the winter

1 range, this varies a great deal from year to year. What
2 evidence is there now which would indicate the reason
3 for this? Is it a question of a climatic realm which would
4 effect them, or, I've heard it strongly expressed that it's
5 more indeed a question of hard snow pack and ice, which
6 dictates how far they would move.

7 MR. SURRENDI: Well, we
8 attempted to, we did not study this, incidentally, in depth.
9 We were capitalizing on some fairly cursory information
10 that we obtained, but basing a lot of our interpretation
11 on some fairly indepth work that's being done by others
12 over fairly ^{long} periods of time, on the causes of caribou
13 movements and why they tend to go in certain places. It
14 just so happens in this case, that the geography of the
15 northern Yukon is very unique, or different, not unique,
16 but different from where a lot of these others studies
17 have been conducted, so you have more of a situation where
18 you have concentrations in valleys, you have wind blown
19 ridges which may act as transportation routes for caribou
20 with low snow and hard pack. I think that the general
21 opinion is that climate definitely does have a very
22 significant bearing on the movements of these animals,
23 particularly snow depth and pack.

24 Of course, there are also
25 indications that some of these migrations are a combination
26 of the factor of climate with the onset of pregnancy -- or not

1 pregnancy, but parturition in the female, which tends to spur
2 migration back into calving areas which are quite localized
3 areas. This combination of factors seems to be what causes
4 these animals to migrate and I'm sure that's not all, but
5 that's what appears to be on the surface at this point, but
6 I don't really believe that all of the factors have ever
7 been put into one handful and assessed. Certainly there's
8 a tendency for these caribou populations, here in the Yukon
9 there's the Porcupine herd, and in the elsewhere, and in the
10 central Arctic, to have an area which they seem to prefer
11 for calving due to certain conditions, and an area that they
12 tend to winter in.

13 The conclusion we drew is
14 that the entire range of the Porcupine herd tends to revolve
15 around a calving area, which is a fairly big area; but they
16 can, in fact, winter in particular parts of that area.
17 How successful they winter in different parts of that area
18 we do not know. That is, maybe survival is higher when they
19 move into the central Yukon to winter as compared to
20 wintering along the north coast, for example. We don't
21 know that.

22 MR. CHAIRMAN: Mr. Wykes?

23 MR. WYKES: Mr. Surrendi, I
24 realize a great deal of the work you did on your study was
25 related to aircraft and the effect on caribou and some of
26 our discussion has been on possible restrictions to

1 vehicular traffic on the road and realizing that part of
2 the monitoring or surveillance program for a pipeline might
3 require aircraft. I wonder if you'd just mind commenting
4 on some of your findings of the effect of aircraft on
5 caribou.

6
7 MR. SURRENDI: We found that
8 caribou reacted, and I should preface this comment by saying
9 we did not study the physiology, we didn't study the meta-
10 bolic rates of caribou to determine what that stimulus of
11 an aircraft did. What we simply did, and we consider it
12 relatively a superficial study, was look at the immediate
13 visual response of these animals to the presence of an
14 aircraft at a predetermined height, and there are just many
15 variables that can be involved there. However, based on
16 near five hundred observations of the immediate response
17 of caribou to aircraft, we found that they tended to react,
18 at different times of the year and in different habitat
19 types and in different activity periods, differently to
20 aircrafts.

21 Generally, we concluded that
22 there were more violent reponses, they were more sensitive
23 to aircraft during the fall rut in October and November and
24 during the calving period in early June. We found that they
25 were more sensitiive to aircraft in treed areas as compared
26 to tundra. We found that animals that were active were
more senstive to aircraft than animals that were resting or

1 lying down. In particular, the caribou seemed to be most
2 sensitive to aircraft at crossing points on rivers or water
3 bodies. These are traditional sites, there is prehistoric
4 evidence of their use. The establishment of the hunting
5 villages, the town of Old Crow, are all based upon traditional
6 crossing points really of caribou, mainly over water bodies
7 and we found that those caribou were most sensitive to air-
8 craft in those circumstances.

9 The elevations that they were
10 most sensitive to, tended to be less than two hundred feet
11 or sixty meters approximately. We feel that one would have
12 to understand the implications of aircraft disturbance far
13 more before I would conclude what the most appropriate
14 height was and I probably would be very conservative at
15 this time in giving an estimate of height. Let's say
16 fifteen hundred feet or a thousand feet, somewhere in
17 there as being a conservative estimate of height.

18 MR. CHAIRMAN: Doctor Hughes.

19 DR. HUGHES: These small bands
20 of caribou, a few dozen to a few hundred, of one season
21 from North Fork Pass and for -- and on down the Blackstone,
22 these are a discreet population are they, when you see
23 these in the mid summer.

24 MR. SURRENDI: There are
25 resident caribou in that, in really most of the areas that
26 the Porcupine caribou herd does move into. I'm sure that

1 the Yukon Game Department could give you an idea as to, you
2 know, the numbers there. There were definitely resident
3 caribou that were encountered by the migrants as they come
4 into the wintering area.

5 DR. HUGHES: So this provides
6 further complications to this construction window notion?

7 MR. SURRENDI: I would have
8 to let my colleague from the Yukon answer that question.
9 I think he did already as I recall but.

10 DR. HUGHES: I must have missed
11 that. I didn't hear any reference to those -- the caribou
12 that you see in the, you know, from North Fork Pass and
13 on down the Blackstone in the summer time.

14 DR. HOEFS: As I say, I didn't
15 address that problem. I don't think there's too many
16 resident caribou right along the Dempster right-of-way.
17 There may be some, but we know from the outfitters that--
18 there's three outfitters in the Dempster area, and they
19 get the caribou when the migration comes in not before that,
20 But farther to the east in the Hart River area there
21 are resident caribou. So there may be some along the
22 Dempster, but definitely not very many.

23 DR. HUGHES: Well I just heard
24 of a band of a couple of hundred and to me it looked like
25 a significant population.

26 DR. HOEFS: We have never

1 serviced the area. All we know is what we know from
2 the outfitters.

3 MR. CHAIRMAN: Mr. Chambers?

4 MR. CHAMBERS: I wonder if
5 you'd like to expand on one of your last points in your
6 presentation. I know there's a joint management and ad-
7 ministration of migratory birds through the Migratory
8 Bird Act. I wonder if you'd like to expand on your sug-
9 gestion here of a joint management and administration of
10 the Porcupine caribou herd where it crosses international
11 boundaries, as well as the Federal and Territorial juris-
12 dictions.

13 MR. SURRENDI: I think it
14 should be clearly understood that there have been quite
15 a few initiatives in this regard. Particularly recently
16 and, in fact, I've been presented with some very current
17 initiatives in that regard, as to proposals to do this very
18 thing.

19 I don't see a great deal of
20 difficulty, particularly in Canada, of bring the responsible
21 agencies together. I think they, in fact, discuss the
22 particular points quite openly and perhaps the question
23 could be posed to the Yukon people after I finish. I
24 do know that there have been historically some initiatives
25 to attempt to bring all of the parties together and in-
26 cluding the Alaskans. Now, the success rate there and the

1 enthusiasm I am not aware of, and perhaps some of the details
2 could be obtained from Mr. Manfred Hoefs.

3 DR. HOEFS: Yes, Mr. Chairman,
4 as Mr. Surrendi said, we have repeatedly tried to get a
5 committee going and we have not been successful but we have
6 very good cooperation at the level of field staff, who we
7 are all the time talking to the Alaska people who work on
8 the caribou and the NWT people, but there's so far no official
9 committee but we will try it again.

10 MR. CHAMBERS: Well, I suppose
11 what I'm concerned about here is that, you know, I know
12 that you have joint communications, federal, territorially,
13 and internationally with Alaska people but, in fact, within
14 the Migratory Bird Act, Waterfowl and fly aways are
15 somewhat controlled by joint international meetings and
16 various other things, and it seems that, I though what you were
17 suggesting here and / ^{that's why} I asked you to expand on it, was some
18 piece of international legislation which, in fact, would
19 then give some credibility and control of that herd.

20 MR. SURRENDI: I just may
21 elaborate on what has taken place. There exists a
22 Canada/U.S. committee called a Policy Program Advisory
23 Committee, excuse me, between the Canadian Wildlife Service
24 and the U.S. Fish and Wildlife Service. The, as expected,
25 major thrust of that particular committee has been to bring
26 the, our mutual houses in order with respect to migratory

1 birds. The difference here being that we have two, we have
2 an international agreement with a federal Act and having
3 jurisdiction in both countries over that resource. The
4 topic of trans-boundary wildlife populations other than
5 migratory birds has arisen. The difficulty here though, is
6 that jurisdiction rests with the participating agencies
7 from the stand point of either provinces, territories or
8 states. So in essence, our role is to act as a catalyst
9 to bring these people together. We have no power to exert
10 over these people and I don't believe there's any intention
11 to. I think that informally things happened as Mr. Hoefs
12 said However, I guess what I was getting at in this part-
13 icular presentation was that at this point in time this
14 particular population of caribou is probably being under-
15 exploited; however, the opportunity may be there, and not
16 long, for the potential for some fairly heavy exploitation
17 of that population.

18 I think that it might be
19 useful for the protection of that particular resource
20 that some form of allocation of the harvest of that resource
21 be identified and I think that you can only do that through
22 some cooperative work to determine management needs from
23 the standpoint of research and also protection of the
24 herd, in both countries and among all of the jurisdictions
25 involved.

26 MR. CHAMBERS: Yes, I think

1 that's what I was looking for. It seems to me in both
2 the reports that I've read both the Berger Report and the
3 NEB Report, there was certainly concerns about that
4 Porcupine caribou herd, but nobody seems to have come up with
5 a recommendation as to where to go from here and it's a
6 first time that I've heard, at least, some suggestion
7 publically on it to one of these Inquiries as to what
8 should possibly happen with it. Rather than sort of leaving
9 it as a concern and then dropping it at that point.

10 MR. SURRENDI: I know that
11 discussions are actively going on between the two federal
12 levels of both countries and I know that informally that
13 discussions have gone on within the countries among the
14 agencies involved and, in fact, informally across the
15 international borders. I think the, some difficulties have
16 been encountered because of the relative urgency of some
17 participants not being really acknowledge in some cases by others.
18 I'm not so sure that Alaska feels there's any difficulties
19 and there's also -- there are also some difficulties
20 being encountered with respect to, and I'm not speaking now
21 in Canada, at least to my knowledge, some jurisdictional
22 questions within the state of Alaska and I don't know all
23 the details of that; but there is, in fact, a reluctance,
24 at least to my knowledge, to jump into an international
25 arrangement. And if I'm off base I hope Manfred Hoefs
26 will correct me.

1 DR. HOEFS: I don't know much
2 about it, but I think you're right. That's what I heard too

3 MR. CHAIRMAN: Mr. Trevor?

4 MR. TREVOR: Just one last
5 question Mr. Surrendi. You, in the remarks you just made,
6 you referred to under exploitation and over exploitation.
7 Do we infer from that that indeed this is a valid manage-
8 ment plan and that one wouldn't consider total protection?

9 MR. SURRENDI: I'm not sure
10 I understood, Brian, what your question was. Could you
11 repeat it please.

12 MR. TREVOR: You indicated
13 that you thought now it was under exploited. I read into
14 that the fact that you would permit a take from the herd.
15 In other words, it's not that endangered. You're not looking
16 at this point in time, at total protection. Are we a long
17 way from that point?

18 MR. SURRENDI: Based on the
19 work that we did we determine that there was between an
20 annual increment of somewhere around five thousand
21 animals during the time that we worked on that particular
22 population. The annual harvest calculation is far below
23 that, both from hunting along the Dempster, sport and
24 subsistence, and hunting by the communities, both in Alaska
25 and in Canada. What I'm getting at is that there is a
26 possibility in my opinion, for a higher sustained yield

1 from that population. I believe that before a great deal
2 of effort is put into harvesting more animals, that we
3 should truly understand the population dynamics of that
4 herd, to where we can, in fact, maintain a high -- the highest
5 sustained yield we can and by the same token protecting
6 the viability of the population. To absolutely protect
7 that population, in my opinion, will result somewhere in a
8 crash in that population due to natural conditions.

9 MR. TREVOR: Thank you.

10 MR. CHAIRMAN: You mentioned
11 that the road was poorly designed. You referred later to
12 a different layout going outside of the area of the caribou.
13 Could you expand on the design aspect. Is it built too
14 high or what are the physical characteristics.

15 MR. SURRENDI: Well, to begin
16 with, it's, in my opinion, it's in the wrong place, which is
17 a major design flaw and that it with some consideration
18 could have been moved, at probably higher cost naturally,
19 to the southeast, thus avoiding what may be a fairly major
20 problem in managing that population. The road specifically
21 could -- there are many design features, I guess is what
22 I'm trying to say, that could be built into that road, even
23 now, and I think that more work could be done to determine
24 better what those design features could be.

25 I site such things as
26 gradient of slope off of the road. In some areas the slope

1 is creating snow traps which are effective fences, snow
2 fences really, which deflect caribou movements. There could
3 be -- there's an awful lot of opportunity in my opinion, for
4 work to be done to deflect the caribou off the road once
5 they get on it and in some cases they can't get off of it
6 and this could, in fact, be a dangerous situation for
7 traffic, particularly at night. In other words, areas
8 where they could, in fact, escape from the roadway and this
9 could be simply, similar to these areas that they have for
10 trucks to drive off. Well this would be a caribou drive-off
11 I guess.

12 The profile of the road
13 relative to the topography is extremely important. The
14 higher the profile the more the tendency for it to be a
15 barrier. Low profile roads, ^{where} where feasible, would be less of
16 a deterrent to caribou movements than high profile roads
17 and I acknowledge engineering difficulties here. There are
18 certain situations that we observed, however, that I think
19 could have been avoided and may still be avoidable.

20 Certainly if one is consider-
21 ing a bermed pipeline, many of the criteria that would
22 relate to a good road design also may ^{have some} bearing on good berm
23 designs for buried pipelines. And I don't profess to know
24 all the answers. I believe there are many more opportunities
25 for better design of roads relative to caribou and also
26 pipeline berms that we might be able to certainly capitalize

1 on.

2 MR. CHAIRMAN: A scenario
3 seems to be developing here where the road is being con-
4 structed and the caribou are being studied. The road will
5 be operated, presumably, with some features to traffic,
6 interruption in traffic and so on. The road probably
7 will be changed based upon the wildlife specialist's
8 recommendations and all of the studies going on and the
9 analyses being done and alongside of that a pipeline company
10 presumably will be carrying out studies in order to deter-
11 mine what the environmental effects could be, first of all
12 in the construction phase, and then secondly, of course,
13 in the operational phase.

14 Could you offer us any advice
15 on logistics here. It would appear that several activities
16 to do with the caribou will be going on at the same time
17 to meet different but related needs but, in fact, if
18 the pipeline company will have to produce an environmental
19 impact statement the people operating the road presumably
20 will have to develop an operational plan for the road and
21 presumably the same data is to be used in both directions.

22 We get into the question of who
23 should do what and, of course, as a side it's probably not
24 our responsibility, but how it should be financed. Do
25 you have any advice on proceeding with this as quickly as
26 possible?

1 MR. SURRENDI: No. If I knew
2 all of the answers to that one I'd be pretty rich. One
3 thing that I'm not clear on is whether another road will
4 be required adjacent to the pipeline. That is, even if
5 the Dempster is used as a route or as a part of the corridor,
6 would there be another road required as a maintenance road
7 adjacent to the actual line?

8 MR. CHAIRMAN: Mr. Bouckhout
9 could probably answer that.

10 MR. BOUCKHOUT: No it wouldn't
11 in normal cases, however, if one were to contemplate summer
12 construction in certain areas, it may be necessary to lay
13 down some sort of a pad in order to permit summer con-
14 struction but in normal cases we do not contemplate the
15 necessity for any kind of permanent roadway along the
16 right of way.

17 MR. SURRENDI: I'd have to
18 kind of beg that question somewhat, Mr. Chairman, and say
19 that with more information on the logistic requirements on
20 the actual distribution of manpower and equipment along a
21 pipeline construction operation of that size one would have
22 to try and -- for the viability of both, the road and
23 the activities that go on on that road and the construction
24 of a pipeline, try and complement those activities with,
25 bearing in mind constraints which should be imposed in
26 order to protect, in this case, caribou population. I

1 think I'd have to beg off and say that with some additional
2 information before me on what it exactly entails, the
3 construction of that line, I think one could answer that
4 question somewhat better.

5 MR. CHAIRMAN: Sorry for
6 putting you on the spot. Mr. Trevor?

7 MR. TREVOR: Perhaps we could
8 rephrase it another way then. In terms of our present
9 knowledge what needs to be tackled next. Is ~~it the question~~
10 of the behavioral pattern of the caribou relative to kinds
11 of disturbance, whether this be shooting or aircraft or
12 whatever, or is it the necessity to find out where they
13 are at a particular time or where they're likely to be
14 at a particular time of the year.

15 MR. SURRENDI: Well, before
16 I get into my answer, my suggestion would be that those
17 agencies^{that} are involved in managing this population should
18 be the ones to really sit down and determine some of these
19 needs. There are various kinds of needs I see as far as
20 research. Certainly we really do not have an adequate
21 handle on the behavioral response of wildlife populations
22 generally, and specifically the porcupine caribou herd in
23 this instance, to the kinds of developments that are
24 going on or are contemplated in this area. I see a lot of
25 useful information that could come out of some well designed
26 cause and effect type investigations that would, in fact, be

1 able to contribute significantly to the design features of
2 a highway or a pipeline. In addition to the information
3 that would be required for the management of that population
4 from the standpoint of population dynamics and to what
5 detail you need, that would have to left up to the game
6 departments involved.

7 There is a lot of opportunity,
8 in my opinion, for some useful applied research that could
9 be beneficial not only in the Yukon but in other parts of
10 northern Canada with respect to the design of transportation
11 facilities and wildlife requirements.

12 MR. TREVOR: If you'll study
13 in cause and effect, is there any possible way of doing it
14 without having the road there and the truck there at
15 sixty miles an hour if that's what you want to find out.
16 Is there any way you can simulate these things?

17 MR. SURRENDI: There are ways
18 of doing some of these things. We don't have to do it
19 on the Dempster in some cases. There are other areas
20 that have been, that developments have taken place in and
21 in some cases they're not even permanent developments.
22 For example, the response that we were getting, observing,
23 of caribou along the Dempster Highway with respect to the
24 physical features of that highway were very similar to the
25 information of observations obtained for winter seismic
26 operations and caribou reactions on Banks Island. Doug

1 Urqhart did work within the last ten years on winter seismic
2 activities and the effect on caribou movements. Much of
3 the information was very applicable, for example, those
4 caribou are responded to the bulldozed snow adjacent to
5 us as a result of a Cat moving along a seismic line on the
6 tundra the same way as they did to the deep snow conditions
7 adjacent to areas of very high profile on the road. In
8 fact, they wouldn't cross that seismic line until it drifted
9 in. In other words, until it got a lower profile and they
10 could just walk over top of it.

11 So there are other -- I think
12 that with some sincere effort and thought, the opportunities
13 are there in place in the Yukon and in other areas to do
14 this kind of work. Certainly, one thing that should be
15 borne in mind is that once a development of this kind is
16 established it should be capitalized on from the standpoint
17 of really documenting exactly how well your guidelines
18 or conditions met the anticipated needs.

19 MR. CHAIRMAN: Do any of our
20 advisors have questions for Mr. Surrendi? Mr. Parkinson?
21 Mr. Klassen? Mr. Hernandez?

22 MR. HERNANDEZ: This is sort
23 of a follow up to the first question that Dr. Hughes asked
24 you about the possible scenario of the Eagle Plains. Let's
25 assume that the gas pipeline is built and they do go in and
26 explore and find some structures there. Are there any

1 indications of the implications of a gas development field
2 such as the one at Prudhoe Bay or an oil development field,
3 have on caribou in terms of it's size and does it shut them
4 out. I know that Prudhoe Bay is a summer operation in terms
5 of the caribou are there largely in summer time, would it
6 be different in winter, for the winter range?

7 MR. SURRENDI: I'll answer
8 that question to the best of my ability in I would suggest
9 that if Don Thomas has any comments to add he feel free to
10 add them. I've had an opportunity to spend some time in
11 Prudhoe Bay where production facilities were in place. One
12 of the things that seems to be a characteristic of wildlife
13 generally, although in some places it can't be applied across
14 the board--facilities that are in place, not moving, that
15 emit sort of a constant drone, tend not to bother wildlife
16 populations generally, with the exception of white geese
17 which are quite sensitive to these things, and I'm speaking
18 now of pumping stations as an example. On the contrary,
19 with caribou, they tend to become a pest around the drilling
20 rigs at Prudhoe Bay and they have to keep moving them out
21 of their operations there. I don't know if I answered
22 your question.

23 MR. HERNANDEZ: Partly, I
24 was just wondering if there was any indication of whether
25 winter behavior would be similar or would you expect them
26 to be more wary or whatever.

1 MR. SURRENDI: I really
2 answer that question and if Don Thomas can answer that --
3 he says he can't answer it either.

4 MR. HERNANDEZ: Thank you.
5 I'd also like to just mention an observation with regard
6 to your observation of the caribou following seismic lines
7 or rights of way through cleared areas. We had some
8 revegetation plots up at Prudhoe Bay and started in
9 '71 and I sampled them in '72 and the caribou there really
10 loved them. They grazed on the plots and kept them down.
11 Now, the tundra is different from the forest where you don't
12 have to have a right of way, or a right of way doesn't give
13 you added access but the -- if caribou do follow a line
14 then that has some implication for the success of any
15 revegetation attempts whether it be natural or seeded.
16 I'd just like to mention that.

17 MR. SURRENDI: Just one added
18 point to that comment. This is really a feeling that we
19 had after we observed some of these movements along cleared
20 areas, that is, it was a question of ease of access and
21 movement that seemed to encourage them to use certain
22 segments of these seismic lines and they went off them
23 at certain points but it does have bearing on your point
24 that you've made with respect to revegetation and that is
25 if you were to really sock it to your right of way with
26 various fertilizers and you had a very lush growth of

1 vegetation along that right of way and that combined with
2 this ease of access, you actually might have some difficulties
3 with respect to the effects of the caribou on the pipeline,
4 which is a twist.

5 MR. CHAIRMAN: Maybe we could
6 ask Doctor Vaartnou to comment on that. Before you do,
7 the question we discussed earlier on the effect on the
8 caribou that are in winter range if a pipeline were to be
9 constructed in the winter time through their winter range
10 and your comment about the caribou becoming pests around
11 the drilling rigs, of course, brings up the question
12 whether or not you would expect a big effect on the caribou
13 that are in their winter range or if the caribou would
14 simply move off or move towards the activity, it would
15 be a curiosity factor or whatever. Could you describe
16 what you would expect would happen?

17 MR. SURRENDI: Mr. Chairman,
18 the general impression that we obtained during our work
19 was that caribou were quite willing to approach stationary
20 objects and stationary equipment but moving objects, moving
21 equipment, moving people tended to create a negative stim-
22 ulous and that is the caribou would tend to turn and leave.
23 One thing they are, definitely, is persistent on migration.
24 We used to, in fact, near Old Crow, we witnessed caribou
25 crossing rivers, making attempts to cross the Porcupine
26 River at least four times when we were marking animals there

1 with neck collars. That persistence tended to be related
2 to the size of the group with the greatest amount of
3 persistence with the larger the group size. They would
4 very willfully walk in and start swimming toward waiting
5 hunters and only until the hunters started to shoot and move
6 did they start to respond negatively and turn and try and
7 go the other direction. So they tend to respond in a
8 negative fashion to activity, that is, a motion, equipment
9 moving, and that was very similar to what we observed on
10 the Dempster Highway. Vehicles moving along the highway
11 tended to cause a negative response and I indicated that
12 most of the crossing of the highway occurred at night time
13 when the vehicles were not allowed to travel.

14 MR. CHAIRMAN: Yes, I was
15 referring specifically to, not to the migration time, maybe
16 I'm confusing the situation here, in the winter range
17 are they migrating all the time or are they fairly stable
18 in their winter range.

19 MR. SURRENDI: Well, they
20 tend to move depending upon snow conditions and available
21 food supplies. The observations on the Dempster were on
22 the winter range. That is, they were on the winter range
23 when they were encountering the situation that occurred
24 on the Dempster. They are persistent in migration. That
25 is, if they don't succeed here they might try and do
26 something else. Now, the question is how far down, or if

1 you exclude them from migrating down further into that
2 winter range, what are the implications of that from a
3 physiological standpoint. Do they -- is there a reduction
4 in the viability of the female to carry young.

5 MR. CHAIRMAN: Yes, or else,
6 you know, a pipeline ditch would be opened for, I don't
7 know how many miles, three or four or five miles and the
8 question is would they just go around it.

9 MR. SURRENDI: Yes, well,
10 I don't really know. I know that we have a standard view,
11 I guess, that caribou will be herded anywhere they want
12 to go.

13 MR. CHAIRMAN: Yes, like
14 cows or pigs. Mr. Bouckhout, do you have any comment?

15 MR. BOUCKHOUT: I have
16 just one question, that's in respect to one of the last
17 topics regarding caribou reaction to moving vehicles. Were
18 these observations done over an extended period of time in
19 reaction to very extensive activity? In other words,
20 were there many many pieces of equipment and personnel
21 working at one location at one time or was it sporadic
22 kind of thing. What I'm getting at essentially is, would
23 there be a possibility for caribou on a winter range to
24 accomodate to activity over, say, a period of several
25 months?

26 MR. SURRENDI: Well that's a

1 difficult question for me to answer. The information that
2 we obtained, first of all we did not influence the behavior
3 of the caribou by our presence. We observed from various
4 vantage points, the activities of vehicles and people and
5 caribou. That was, in fact, recorded on film, which we
6 analyzed at a later date. Your point, though, is whether
7 the conditions of observing, or of vehicle travel on a
8 highway with occasional hunting at certain parts of that
9 highway, would be somewhat different from a large scale
10 construction operation moving along. I'm afraid I
11 couldn't answer that question. I wouldn't know whether
12 there would be a difference. This is something I think,
13 that certainly could be found out.

14 MR. BOUCKHOUT: One additional
15 question. What was the reaction distance, in other words
16 how close were they to the site of activity or the moving
17 vehicle before they reacted?

18 MR. SURRENDI: The caribou
19 responded normally. Are you saying the reaction distance,
20 how far did they react after --

21 MR. BOUCKHOUT: How far were
22 they when they reacted?

23 MR. SURRENDI: The distance
24 varied right up to, you know, I would consider it a matter
25 of a few meters to, I'm just -- I'll give you an approx-
26 imate answer there for the sort of the maximum that we

1 observed and that would be within a kilometer. The reaction
2 of the caribou once stimulated actually went up to twenty
3 kilometers, that is, they left in a reverse direction and
4 went up to twenty kilometers. The average distance of
5 response was about one kilometer away from the road again.

6 MR. CHAIRMAN: Any questions
7 from panel staff. Mrs. Archibald?

8 MRS. ARCHIBALD: I was just
9 wondering, Mr. Surrendi, whether your calculations of under-
10 exploitation took the extent of predation into account. If
11 hunter take is increased would you then advocate a predator
12 control program?

13 MR. SURRENDI: I better just
14 clarify what I meant by the term I used, "under-exploitation".
15 This is a feel we had when we finished working on that
16 caribou population. We have yet published the dynamics of
17 that population that we felt we had an appreciation for.
18 The very problem that you've alluded to, natural mortality,
19 we had a very poor handle on and therefore we had to make
20 some fairly brash calculations that certainly could be
21 refined.

22 This question that you posed,
23 that is, and I'm not sure if I'm clear on it, the -- if we,
24 and you may clarify this for me, if we did not increase
25 the kill, are you indicating that there should be some
26 control mechanism on that population?

1 MRS. ARCHIBALD: No, I'm
2 just wondering whether, if you allow an increase in the
3 exploitation of the herd, whether you aren't going to have
4 to have a predator control program at the same time because
5 don't they account for the difference between the product-
6 ivity and the recruitment?

7 MR. SURRENDI: Not necessarily.

8 MRS. ARCHIBALD: Not ex-
9 clusively, but to a large extent. Obviously there are
10 other mortality factors as well.

11 MR. SURRENDI: Right, the
12 point in question, though, is that given a set annual
13 increment, that is if that is true, that is there is an
14 annual increment, the partitioning of that among the
15 predators, whether they're natural or man, I guess with
16 a rifle, is not solely related to the actual realized
17 increment from the standpoint of those animals that come
18 into the bag. In that, what you will have is a change
19 in response of the, in the productivity of the population
20 as well, which will respond to a certain level, that is,
21 invariably you get an increase in productivity under stress,
22 that is, stress from the standpoint of hunting. As you
23 stress that population more and more you're actually
24 opening up more habitat as you reduce that population
25 down, to the survivors and so you actually have an opportu-
26 nity for an increase in productivity of the population. For

1 example, just as an example, under the present conditions
2 you might have fifty percent of the adult females bearing
3 young, that is and having them survive. You might get
4 a response, a resiliency in that population up to sixty
5 or sixty five percent of those females showing this kind
6 of participation as a productive female in the population
7 under certain stressful conditions from the standpoint of
8 cropping. But your comment is true really. I guess it's
9 this kind of thing that I'm saying we should find out more
10 about if we're going to manage.

11 MRS. ARCHIBALD: You say
12 there's a critical point at which they can't reproduce
13 further.

14 MR. SURRENDI: That's right.
15 And I'm saying that the management agencies involved should
16 identify the level of management refinement and knowledge
17 they need to do that.

18 MR. CHAIRMAN: Any more
19 questions from panel staff? Dr. Schilder?

20 DR. SCHILDER: Mr. Chairman,
21 I have a question for Dr. Surrendi. My question is, what
22 further research priorities would you suggest to assist
23 to save the caribou herd in respect to potential pipeline
24 project.

25 MR. SURRENDI: Could you
26 just repeat that once again please?

1 DR. SCHILDER: What further
2 research priorities would you suggest to assist to save
3 the caribou herd along the Dempster Highway in respect to
4 potential pipeline project.

5 MR. SURRENDI: I'd also throw
6 the highway in there as well, as a potential problem. I
7 alluded to this somewhat before. First of all I think that
8 certainly the Yukon and Northwest Territories people should
9 be involved in this type of a discussion because there are
10 not only management needs but there are these needs that will
11 effect management from the standpoint of research and my
12 opinion is that there certainly should be some behavioral
13 work done on the Porcupine caribou herd to better under-
14 stand the response of these caribou to certain man-made, or
15 man-induced activities whether they're physical or not.
16 And when I say not I mean things like airplanes that come
17 by and there's no sign of a change in the earth surface.
18 So that appropriate design criteria can be developed to
19 better accomodate the free passage of these animals
20 through areas that are in fact physically changed, or,
21 where appropriate conditons or regulations imposed on
22 human activities that would better accomodate caribou needs
23 such as aircraft restrictions, or maybe the use of skidoos
24 off of that highway.

25 There are other research
26 needs, though, that relate to some of the questions that

1 Mrs. Archibald posed and that is research required to
2 better manage the population depending upon what level
3 of refinement you seek. And those questions are, I think,
4 more appropriately asked and answered by the management
5 agencies involved as to what level of information you
6 need.

7 DR. SCHILDER: Could I have
8 another question, Mr. Chairman. What is the most critical
9 activity according to your opinion which should be
10 controlled concerning the existing or expected operation
11 and maintenance of the Dempster Highway?

12 MR. SURRENDI: Well, there
13 are more than one activity that seem to work together.

14 DR. SCHILDER: If you don't
15 mind, I would interject. I'm asking this question in
16 connection with a statement which we all heard yesterday.
17 Mr. Daniel Nolan, in his briefing made one statement I'm
18 going to quote a sentence which he used, in order to be
19 precise. "The main danger of the continued existence of
20 this great caribou herd, as I see it, is hunting." I know
21 that the question which I have asked is in connection with
22 operation and maintenance of the highway, however, hunting
23 from the highway, as it was emphasized, is somehow very
24 closely interrelated to the problem.

25 MR. SURRENDI: And I made
26 a statement relative to hunting that if it's controlled it

1 won't hurt the population. I wasn't at crosspurposes with
2 Mr. Nolan . My opinion is that there are two areas that
3 certainly should be looked at from the standpoint of reg-
4 ulation intensively and that is the mere fact that the
5 opportunity exists at certain times of the year and perhaps
6 not yearly or annually but occasionally for a real
7 devastating blow to be given to those caribou from that
8 particular highway. We haven't really seem, or at least
9 appreciated in my opinion, the total extent of that potential
10 harvest that could occur from that highway. And so my
11 immediate reaction to your question would be that activity,
12 that is vehicular activity, in combination with hunting could
13 be very detrimental from the standpoint of not only mortality
14 but actual free movement of that population across the road.

15 I might even add one thing
16 further that, and I alluded to it in my presentation that
17 commercial hunting could be devastating on that highway.

18 DR. SCHILDER: Mr. Chairman
19 I have a final question. Dr. Surrendi, you have indicated
20 in your brief greater significance for caribou in crossing
21 certain streams at particular ridges and you also have been
22 very specific in certain criticism concerning the route
23 of the existing Dempster Highway. Would it be possible
24 from your research to make available the information
25 concerning the river crossings on a map or showing also
26 in more precise details, the area which have been recognized

1 as extremely critical or significant for surviving these
2 various herds of caribou in that area? Could this inform-
3 ation be made readily available for the benefit of the
4 panel?

5 MR. SURRENDI: I'd be happy
6 to. I've, in fact, I'll give you a copy after I leave the
7 discussion here.

8 MR. SCHILDER: Thank you, Mr.
9 Chairman.

10 MR. SURRENDI: I might just
11 just add one further thing and it relates to this question
12 of hunting and vehicles along the Dempster Highway. The
13 people of Old Crow, as you're aware, have historically, and
14 still, hunt caribou at traditional areas, as traditional
15 mainly stream or river or lake crossing points. They've
16 hunted in some of these crossing points since, in the memory
17 of the people that are there. The indications are that
18 hunting per se, that is, the shooting of caribou at these
19 crossing points has never deterred them from using those
20 crossing points. This leaves me to question the responses
21 we're getting along that highway that there's something
22 other than hunting that tends to be a negative stimulus
23 when those animals encounter the Dempster Highway.

24 DR. GUTHRIE: I wondered if
25 I could just seek one point of clarification here. Mr.
26 Surrendi mentioned the persistent nature of migrations. In

1 going through the literature it struck me that the spring
2 migrations were fairly persistent, in other words, the
3 caribou were going to migrate north come Hell or high water
4 but I didn't get the feeling that that same persistence
5 applied to the migration back. It seemed to be more a
6 drifting back and I wonder if somehow the interruption of
7 that migration might be a more possible impact in terms of
8 alienating certain segments of that winter range. Could
9 you comment on that and tell me if I'm understanding what
10 I read in the literature correctly?

11 MR. SURRENDI: You're focus-
12 ing on the fall migration which you gather is somewhat
13 more of a relaxed migration. It's not as persistent. I
14 think in general you're correct. It depends a great deal
15 on weather conditions which tend to push these animals.
16 In fact, the indications are that they drift over rather
17 specific areas during the summer and then they start to
18 lend themselves toward a southern movement in this case,
19 usually. I think that, for example, if in the construction
20 of a pipeline, certain segments of that line were initiated
21 before a particular segment of that population had passed
22 through, you might, in fact, create some kind of a dis-
23 ruption in that movement if, in fact, you had an open
24 ditch, for thirty miles. I don't know if that's feasible
25 or not but I think the important point here is that during
26 a construction or as part of your construction activity

1 that you have a pretty good handle on what that population
2 of caribou is doing so that you can incorporate the move-
3 ments of those animals to the best of your ability to your
4 construction activities if that's feasible. So you monitor
5 if possible, the distribution of those animals during
6 construction.

7 DR. GUTHRIE: One other slight
8 point perhaps. You mentioned the crossing the river and
9 that the hunting didn't seem to keep them from crossing
10 the rivers, I wonder, are they crossing the rivers there
11 because they don't have any other suitable places or -- and
12 does this occur in spring as well as in the fall when
13 they're coming back or could hunting, say at some points
14 like this in that more relaxed fall migration cause them
15 to shift their whole winter ranges. That's really what I'm
16 wondering.

17
18 MR. SURRENDI: The evidence
19 that we had and it dates back a long time, we actually
20 have indications of the use of these crossing points north
21 and south, that is on both spring and fall migrations.
22 And, of course, there are some that really don't use
23 crossing points in the Richardson Mountains. But those
24 that did, in fact, go across the Eagle Plains and
25 then through the Old Crow Flats area used traditional
26 crossing points in both migrations consistently and evidence

1 dates back at least four thousand years that they've been
2 using those crossing those crossing points both ways during
3 that time.

4 MR. CHAIRMAN: Thank you
5 Dr. Guthrie. Is that your questions? Does the panel have
6 any more questions? Would you like to say anything to sum
7 up?

8 MR. SURRENDI: Well, nothing
9 significant other than the fact that Porcupine caribou here
10 is second to no other free roaming wildlife population that
11 I'm aware of in the world. At one or two points in time
12 during the year, it's feasible to witness over a hundred
13 thousand animals on occasion together and that magnificent
14 sight used to be feasible in Africa, it no longer is and I
15 really do believe that it's a resource that certainly should
16 bear the utmost consideration in any developments that
17 take place whether they're highways or pipelines and I
18 have nothing else to say.

19 MR. CHAIRMAN: Thank you
20 very much. Do we have any other people who would wish
21 to address us on the Dempster link issue? If not I
22 suggest a five or ten minute stretch and we'll come back
23 to examination of the alternatives within the Yukon.

24 (PROCEEDINGS ADJOURNED)
25
26

1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 MR. CHAIRMAN: To recap
3 where we are in the consideration of alternatives through
4 the southern Yukon, we're looking at alternate routes and
5 the panel for the information of those people that weren't
6 here yesterday, the panel caused a contract to be lead to
7 Envirocon to compare, do an overview of alternate routes
8 within the southern Yukon and we had the presentation of
9 their findings yesterday. We went through comparisons
10 on the basis of geology, hydrology, wildlife, fish and
11 vegetation. We had questioning of the particular experts
12 who did the ranking, the comparison and we are now --
13 I'd like before we leave Envirocon, I would like to throw
14 the floor open to any questions or comments on the
15 comparison that was made in total. Mr. Trevor.

16 MR. TREVOR: I touched on
17 this yesterday and then backed off because I was politely
18 informed that I was making the wrong interpretation, but
19 having chewed on this all night I would still like an
20 explanation of why the Klondike routing can be ranked 4, 3,
21 3, 2, 4. In other words it's the least preferred corridor
22 in terms of geology, it's the next least preferred corridor
23 in terms of hydrology, it's the next least preferred
24 corridor in terms of fish and the least preferred corridor
25 in terms of vegetation and still would come out as the
26 most preferred corridor in an overall ranking.

1 MR. PARKINSON: Doctor
2 Guthrie is probably the most able to explain our way out
3 of that one.

4 DR. GUTHRIE: I think probably
5 that what we did not make clear to you yesterday, and my
6 apologies for that -- we gave you a ranking because we feel
7 that within our individual disciplines that's a valid way
8 for you to see how each of these componenets does rank, or
9 each of the routes ranks with respect to that component,
10 but what we haven't shown you are overall scores. You see,
11 we are ending up with overall scores and when we rank them
12 one, two and three within a discipline, what you don't see
13 is how close are the one, two and three rankings and when
14 we add these total scores up the final score is a sum-
15 mation as it were, of the impact ratings that we're giving
16 to that route for all of the components that we measure
17 and when we add those up we actually end up with them in
18 two clumps. The Klondike route and the Alaska Highway
19 route are close but the Klondike route is still a very
20 clear first place finisher. That's based on the summation
21 of our total impact scores and you can't, because some
22 of them are quite close you can't add those individual
23 component rankins and come up with a score -- with an
24 evaluation that way that doesn't change the summation
25 of our total scores.

26 So, I apologize if we con-

1 fused you on that yesterday. We should have made it more
2 clear that we did have sums of impact ratings for those
3 routes and that's why the final ranking looks a little
4 strange.

5 MR. TREVOR: I understood
6 that yesterday that it wasn't as simple as adding them
7 together but I still can't conceive of point ratings in
8 connection with those rankings that would be so far apart
9 as to explain the final rankings.

10 MR. CHAIRMAN: Maybe I could
11 ask the reverse question and I think there's a logical
12 answer for it. If you take the Tintina Trench/Liard, your
13 ranking in geology is second, hydrology is first, fish
14 is first, vegetation is third, but in fact all the vegetation
15 rankings are very close together we're told, and the wild-
16 life is fourth. One would have to conclude that the wild-
17 life factor here is very very large and overshadows the
18 other rankings so much that even though it's the only one,
19 except for the vegetation, that is bad, it, in fact, dom-
20 inates the scoring to a certain extent that overall this
21 particular route is ranked, what third or fourth, I've
22 forgotten which. Fourth.

23 DR. GUTHRIE: It is fourth.
24 And your quite correct, that is exactly what happens.

25 MR. CHAIRMAN: Now, as I
26 interpreted that in your discussion, the hundred miles or

1 so of virgin territory in the top end of the Tintina Trench
2 where you had an inaccessible area now where you had good
3 habitat for large populations of wildlife that that first
4 hundred miles within the wildlife score was the factor
5 which caused that particular route to come out so poorly
6 in your total rankings. Is that correct?

7 DR. GUTHRIE: I don't have
8 my individual score sheet for that right here so I can't
9 tell you exactly. I don't remember but what I maybe should
10 tell you is that we have plans to go and look at that
11 particular thing tomorrow and try and give you an evaluation
12 on that to see if that's going to change it.

13 MR. CHAIRMAN: Oh you mean
14 the Carmacks Loop?

15 DR. GUTHRIE: Yeah.

16 MR. CHAIRMAN: Yeah. No,
17 but I'm, yes, I'm just clarifying my own mind of sensi-
18 tivity of your analysis and I think this is what Mr. Trevor
19 was also trying to do. He was suggesting that on the
20 Klondike everything looked bad except for wildlife and
21 that was second but in fact the Klondike came out ranked
22 best so the wildlife factor, because of its large score,
23 is really the dominant factor in those two particular
24 scenarios.

25 DR. GUTHRIE: Yes, I think
26 that's true. Keep in mind that on our group consensus, the

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1 wildlife was assigned three hundred and fifty out of the
2 thousand points and this automatically gives it a kind of
3 heavy weight. It's possible other groups might have rated
4 it differently but this was the concensus of our group and
5 none of us were very far apart on the balloting there when
6 we chose that so we feel that it's probably a reasonable
7 allocation of the point spread.

8 MR. CHAIRMAN: Would you
9 like to pursue it Mr. Trevor?

10 MR. TREVOR: No, Mr. Chairman.

11 MR. CHAIRMAN: Mr. Wykes?

12 MR. WYKES: Mr. Parkinson,
13 I'd like to address this question to you and I believe I
14 understand your method for ranking in terms of the potential
15 for environmental effects, however, my concern, and it's
16 one that I alluded to yesterday was that this is only
17 presenting a partial picture and that unless the potential
18 for implementation of mitigating measures is not plugged
19 into that picture somehow, it's incomplete. And would
20 you suggest or consider that it might be possible that
21 your ranking could be changed on those four routes in
22 view of even what's known now in the types of mitigation
23 measures that could be implemented concerning the six
24 different factors that you evaluated.

25 MR. PARKINSON: How much time
26 have we got? To say that mitigation has been totally

1 ignored in this analysis is not quite right in that we have
2 selected those areas within the corridor where impact would
3 be less so that you could say that a mitigation action of
4 avoiding a bad situation has, in effect, been worked in in
5 some cases.

6 We have, in order to really
7 hit the mitigation aspect fully, you would have to have,
8 at least I feel you'd have to have quite a precise route
9 layout so that you could apply mitigations factors to
10 specific situations. And at this stage the only close
11 alignment that we have is for the proposed Alaska Highway
12 routing so I think, really, in fairness to the evaluation,
13 the comparison, it's better if we avoid working mitigation
14 aspects in.

15 MR. WYKES: I realize that
16 the data is not there, site specifically, to look at
17 mitigation measures and you've looked at the kind of the
18 corridor concept but the theory and whether or not
19 if these were plugged in at a later date, is the potential
20 not there for your rankings to change in view of that?

21 MR. PARKINSON: Oh yes,
22 quite surely.

23 DR. GUTHRIE: May I add just
24 a little something to that? It is possible that the
25 rankings could change if you assume, or if we knew, had
26 a lot of site specific data, and if we could design a

1 mitigation program but I question whether this really would
2 in fact occur because presumably you'd be using the best
3 mitigation you could on any routes. I don't, you know,
4 this is off the top of my head but, you're really talking
5 about a difference here. If one route had a preponderance
6 of essentially unmitigatable effects and another one didn't
7 then this would be true but I would think, you know again
8 off the top of my head, that probably you've got a rather
9 homogeneous situation of mitigatable and unmitigatable
10 problems in there but that's merely a guess on my part
11 at this point.

12 MR. CHAIRMAN: Dr. Hughes?

13 DR. HUGHES: But didn't we
14 yesterday establish the point that particularly in the
15 use of lateral movement as a mitigative measure that the
16 Klondike route and the Alaska Highway route, which ranked
17 first and second -- no -- yes, Klondike and Alaska Highway
18 routes, that they offered the least possibility for lateral
19 movement is a mitigative measure because for long distances
20 they're confined between, well, let's say, between the
21 single Kluane Ranges and Kluane Lake, they're in narrow
22 valleys at a number of points, along the Rancheria River,
23 the Swift River, in the Cassiar Mountains generally,
24 whereas the two routes that the Tintina alternative as
25 a general rule in relatively broader valleys that allow
26 more lateral movement. It seemed to me that that was a

1 point that we had established and that therefore that one
2 particular mitigative measure is much more available in
3 either of those two routes which finished last in the
4 rankings.

5 DR. GUTHRIE: I would empha-
6 size though that that's only one of quite a few mitigation
7 possibilities as the minor route relocation or route
8 selection within the corridor. For a great many of the impacts,
9 and this is particularly pertinent for my own component
10 of wildlife where I'm concerned about exploitation and
11 continued access to populations, the effect is felt quite
12 a distance from the -- it's felt almost on a corridor basis
13 rather than within fifty yards of wherever you happen to
14 put the route so I don't see that it would really make
15 that much difference for some of the parameters that we
16 have evaluated. It certainly is a factor though, and, as
17 to how large, I'm not in a position to say.

18 MR. PARKINSON: The potential
19 exists in most river crossings to affect the lateral
20 movement and thereby avoid problem areas at rivers and I
21 think, as far as lateral movement is concerned this is
22 probably the area where the greatest opportunity exists.
23 There are situations where lateral movement, for other
24 reasons, is advisable, but by and large, I would suggest
25 that river crossings still offer considerable flexibility
26 for location.

1 MR. CHAIRMAN: I'd like to
2 pursue this business of traversing undeveloped territory.
3 It would appear that, from the analysis, the dominant fac-
4 tors are the traversing on undeveloped territory in the
5 top end of the Tintina Trench and the bottom end of the
6 Tintina Trench, that these two factors are scored very, what
7 high, in terms of impacts. And I presume they're scored
8 high because of impacts because a wildlife area would be
9 opened up to exploitation. And we heard earlier today about
10 the Porcupine caribou herd being harvested and comments
11 about under-harvesting and so on, and one can't help but
12 ask the question about what the objectives are in this
13 retaining this area in a pristine manner. Whether it is
14 preservation, in other words are your rankings based on
15 the preservation concept or the harvesting concept, and
16 how did you treat the two, presumably by opening up an area.
17 It's opened for harvest, which is a plus in some people's
18 minds, presumably, and, but it's also open to exploitation
19 and therefore a minus in some people's minds because of
20 the preservation objective. Because these two areas seem
21 to become so dominant in the ranking, I believe we should
22 explore this a little bit more in order to determine
23 your philosophy behind giving impact scores.

24 DR. GUTHRIE: Yes, I think
25 that would be a good idea. I would emphasize first that
26 the exploitation by which I'm really referring to increased

1 harvest of these populations is not the only factor that's
2 taken into consideration where I'm allocating a little
3 heavier impact to new access areas. New access does not
4 mean only exploitation, it means secondary developments,
5 it means additional habitat alienation, it may mean indeed
6 the total alienation of wildlife ranges. It carries a
7 great number of implications aside from mere increased
8 harvest.

9 Secondly, your point is a
10 very good one about why are we being so preservation minded
11 as it were. I hope that is not the case but we're making
12 this evaluation for you at this point in time and I feel
13 that we have to take into consideration, the political
14 realities within which we're operating. I almost hesitate
15 to touch this because it does stray somewhat into the area
16 of politics, and perhaps I shouldn't, but I will.

17 MR. CHAIRMAN: Certainly if
18 it affected your ranking I'd like to hear about it.

19 DR. GUTHRIE: Okay. All
20 right, I will. But, at this point, to open up those areas,
21 I think, would be an absolutely harsh, if not disastrous
22 impact on the wildlife populations for the simple reason
23 that the political realities within the Territories here
24 seem to be that the Game Branch does not have the necessary
25 manpower nor the regulations to adequately manage or police
26 those new access routes. Under a different set of political

1 realities, I might have well assigned a different ranking
2 to that but that is the situation at present. I have had
3 some discussions with various people and I see no real
4 indication that this has changed. And the Territorial
5 Government appears to have a philosophy that while they
6 would like very much to have the new influx of capital,
7 they have been more reluctant to embrace at the same time
8 the kinds of regulations and restrictions and, if you will,
9 restrictions of freedom that every other area that has
10 embraced these sort of projects has found necessary. And
11 that's political sense. I had to, I felt as a professional
12 wildlife person, I have to, at this time, assign a high
13 impact rating to those.

14 MR. CHAIRMAN: Let's explore
15 that issue then. If, in fact, you assumed that in your
16 opinion proper administrative controls were placed and
17 proper game wardens and so on, the right numbers or whatever
18 you think is lacking, could be in place, how much would
19 have your scores changed? Would we be faced with quite a
20 different dominance in your overall ranking?

21 DR. GUTHRIE: I couldn't
22 give you an answer on the spur of the moment that would
23 mean anything at all. You know, it wouldn't be really
24 ethical for me to try and answer that off the cuff like
25 that. If you wish, I will try and give it some thought and
26 provide you with a written answer on that to the panel

1 tomorrow. Would that be of use to you? It will still be
2 a guess.

3 MR. CHAIRMAN: Well, let me
4 get back to you later on that.

5 DR. GUTHRIE: Okay.

6 MR. CHAIRMAN: I don't want
7 to put you to extra work but, I'll have to think about it.

8 DR. GUTHRIE: I appreciate
9 it.

10 MR. CHAIRMAN: Mr. Trevor.

11 MR. TREVOR: To dwell a little
12 longer on this point. It appears to me that you've attrib-
13 uted a spin off effect to the presence of a right of way
14 through a new area which didn't exist before, which cannot
15 be demonstrated by existing pipeline rights of way in
16 similar areas to wit, northern Alberta and B.C. Did
17 you consider or did you look at what the spin off effect
18 was in those areas in making this determination of the
19 extremely high weight that was applied to this factor?

20 DR. GUTHRIE: First off, it's
21 not an extremely high weight. It really isn't that much
22 higher weight than anything else. I did assign it a higher
23 weight by not an extremely higher weight. There are a
24 lot of wildlife values in those areas and that's really
25 where your weighting is coming from. It's an incremental
26 weight because of the new access but it's not really that

1 much higher than it would be if there were existing access
2 through there.

3 Secondly, I think I'm just-
4 ified in assuming a certain amount of increased access and
5 other things in that Tintina Trench because it has been
6 highly -- it's been proposed as a railway corridor and
7 several other major possibilities so I think I have to be
8 a little conservative, a little hesitant about assuming
9 that there won't be. I don't think I could make that
10 assumption.

11 MR. CHAIRMAN: Mr. Chambers.

12 MR. CHAMBERS: Your assess-
13 ment of the routes was based primarily on habitat and because
14 your, I think, the statements were made yesterday, a lack
15 of data specifically on species and population numbers and
16 so on. Is that a fair assumption?

17 DR. GUTHRIE: Habitat
18 evaluation formed a basis for it. I used, as well, any
19 other information I could get, especially the land use
20 maps and various other things to indicate whether or not
21 other people who had examined this thought that there were
22 populations of animals in these areas. I don't and cannot
23 get at this point, site specific informatior on wildlife
24 population so we're really going with the best that we felt
25 we could get in the time, you know, at this time, not
26 necessarily in this time, but at this point in time and

1 space. That seems to be the best way to go.

2 MR. CHAMBERS: Now it seems
3 I'm still grasping for an answer here because the area
4 between south of Whitehorse, west of Whitehorse, it's my under-
5 standing from talking to biologists, it's some of the best sheep habitat
6 found in the Yukon but, you know, because of exploitation
7 etc, there's no sheep there. And I wonder, when you were
8 evaluating these things, the same thing could happen in
9 your evaluation as looking at potential, you know, or
10 habitat evaluation on these routes. It might be very,
11 potentially, a good habitat, but in fact, there may not be
12 any animals in that habitat at all.

13 DR. GUTHRIE: That's a possi-
14 bility. Again, it depends on what sort of a time span
15 you're examining this over. The fact that there are no
16 sheep on a sheep range now, if it is good sheep habitat,
17 may have been removed with, should the Game Department
18 wish, they could probably reintroduce sheep particularly
19 on such ranges. Caribou, I think, are more likely to
20 recolonize such areas on their own but sheep have hang ups
21 about going across wooded valleys sometimes and they have
22 to be put back on certain ranges but if you wanted to look
23 at it in a longer time span, which biologists tend to do,
24 then one has to consider that there might well be, even
25 if there are not animals there this year, there could
26 be next year.

1 MR. CHAMBERS: Yes, but I'm
2 still having some problems with rationalizing how you kept
3 your biases out of the comparisons because, I think as
4 your results have indicated you got what information is
5 available and certainly there is a lot more information
6 both in Federal and Territorial agencies on the Alaska
7 Highway corridor than there is on the Klondike corridor and
8 I'm just still having problems seeing how you kept those
9 biases out of there. You know for a fact, you know that
10 there is a herd of two hundred plus sheep use Sheep
11 Mountain and that must have some significant effect on
12 the biasing of it.

13 DR. GUTHRIE: There really
14 isn't a good answer to that because obviously on a
15 subjective evaluation one does not keep one's biases out
16 of it. One tries to keep one's biases as low as possible
17 which is why we use this systematic approach which has
18 been confusing to everyone, including us at times. But,
19 the effort behind all of this was to reduce those
20 subjective biases, to minimize them, and all I can see is
21 that my feeling is that we have done that but certainly
22 there are biases in it.

23 MR. CHAIRMAN: Yes. Mr.
24 Ricker, I'm just calling adjournment until 7:00 p.m.

25 MR. RICKER: I would support
26 Don on the wildlife values of the areas that we're worried
about.

1 The Geographical Surveys of Canada Memoire written by
2 Dr. Robert Campbell, mentions high wildlife values for
3 that area. A memoire just for the map sheet north of
4 that, 105M, was done by Dr. Bostock and I think
5 that Owen Hughes would contemplate his instructions with
6 Dr. Bostock sometime over supper, he might be able
7 to come up with some wildlife values for the map sheet
8 as well to either confirm or deny what Don here has pre-
9 dicted and so on.

10 MR. CHAIRMAN: Okay, we'll
11 meet at 7:00.

12 (PROCEEDINGS ADJOURNED)

13 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

14 MR. CHAIRMAN: Could we
15 reconvene then? Does the panel have any more questions
16 for Mr. Parkinson? No?

17 One of your experts,
18 vegetation I believe, suggested that if, in fact, a
19 different hypotehsis was used that there eventually
20 would be a pipeline down the Dempster connecting to the
21 main line, that the evaluation, that length of pipeline
22 from Dawson to Whitehorse would have environmental impacts
23 and therefore the analysis would come out different in
24 comparison of the Alaska Highway route versus the Tintina
25 Trench routes. Is that true, generally, or was it just
26 in the vegetation subsection?

Mr. Parkinson
Dr. Guthrie
Mr. Romaine

1 MR. PARKINSON: Dr. Guthrie
2 will respond to that one.

3 DR. GUTHRIE: Yes, I think
4 I'm the author of that. As far as I can tell from
5 discussions with the other members of the team, you could
6 always ask them, but, from our discussions, I think that's
7 pretty generally true that there would be an impact on
8 their parameters as well, their components. We didn't give
9 you that particular version of it because it wasn't strictly
10 within our terms of reference.

11 MR. CHAIRMAN: No, I under-
12 stand. I was just looking for an opinion of whether it was
13 true generally or not.

14 DR. GUTHRIE: Yes I think
15 that's true. It is.

16 MR. CHAIRMAN: I think that
17 what we should do is give other advisors one more chance
18 to ask questions and comment in general before closing
19 off discussion on the Envirocon presentation. Possibly
20 starting at this end. Mr. Romaine?

21 MR. ROMAINE: Yes, Mr.
22 Chairman, I have a question to Mr. Parkinson or his crew
23 for clarification. In the discussion on methodology you
24 indicated, or at least the various component disciplines
25 indicated, that on the physical environment side for
26 both geology and hydrology, a route was actually selected

1 to do the analysis based on, sort of, a most realistic
2 approach to going down through a corridor. So a line,
3 in fact, as I understand it, was basically drawn on a map
4 to identify the problems along the route.

5 On the other hand, on the
6 biological environment, and we had a fair amount of
7 discussion on that, you used a corridor concept. I'm not
8 quite clear, then, how the two are related so I've got
9 sort of a three part question. I wondered how you determined
10 values on the biological side. Did you use sort of a cross
11 section across the corridor and determined an average
12 value for the biological components?

13 (b) Did you relate those
14 then, or was it your intention to do, to relate it to the
15 alignments identified on the physical side, and

16 Three. Would a route analysis,
17 that is depending upon the route selected, possibly change
18 these rankings? Depending on the route selected you may
19 end up with different rankings between corridors. That's
20 the question.

21 MR. PARKINSON: Well, this is
22 getting back into the fundamental area of the analysis and
23 in order to make some of the evaluations with respect to
24 the geological parameter it was necessary to know, pretty
25 well, where you were going so that assumptions were made
26 in particular areas so that we hit favourable terrain and

1 got the best rating for an alternative. Now, clearly, in
2 the period of time that we had we couldn't go into all
3 detail in all the components that we considered so it was
4 just arbitrarily agreed that we would take the most favour-
5 able ratings where there was an option. Then subsequently,
6 where the favourable rating decision was made to attain the
7 most favourable rating the components were viewed in that
8 area for that decision.

9 MR. ROMAINE: So you assessed,
10 say, the habitat value for fish and vegetation along a
11 preferred alignment then as you had determined it from a
12 geological point of view?

13 MR. PARKINSON: In some areas.
14 In general, though, it was a general comparison of a
15 corridor rather than a specific alignment. Now, there are
16 some areas, some locations, where there's a difference,
17 a significant difference in the ranking, the comparison
18 ranking. If you select one location as opposed to another
19 and in these places we have selected the one that gives
20 the most favourable rating and gone through there. Now,
21 these are for short distances, and in general, this is
22 what has been done.

23 MR. ROMAINE: Okay, so in a
24 problem say, stream crossing area or an area where the
25 pipeline would be restricted perhaps because ^{of} topographic
26 constraints, but you have the option on either side of say,

1 a stream valley, I'm still not quite clear how you would
2 select that. You would select the side that appeared to
3 be best from both sides because you may have extreme
4 difference from a wildlife point of view, perhaps, from one
5 side of the valley to the other.

6 MR. PARKINSON: Well, you
7 obviously have some specific location in mind when you
8 raise that question. Perhaps you could tip us off on that
9 one and we could answer it. I have one location in mind
10 where we did, in fact, agree to the most favourable
11 alignment would be on the side of the river that does
12 not appear obvious at first flush and this did, in fact,
13 make a bit of a change. And they, by shifting to that
14 particular side of the river, it improved the rating from
15 both the geotechnical point of view, geological point of
16 view and the fisheries point of view and did not make any
17 change in the wildlife ratings.

18 MR. ROMAINE: Okay, so,
19 basically there was an integration then, between components
20 as you went along so that you haven't reflected the range,
21 say, for mammals across a corridor in a cross section
22 sense, but, in terms of more site specific, in terms of
23 a route actually, than the corridor analysis.

24 MR. PARKINSON: We were not
25 able to get extremely site specific for great lengths of
26 the route. We could only look at really the hot, so called,

1 hot spots. As I mentioned, we have considered about
2 fifteen hundred miles of potential pipeline route in our
3 assessment, or evaluation , and we just haven't been able
4 to go into it in the depth that you're suggesting in your
5 question.

6 MR. ROMAINE: I don't want
7 to flog this but from what I gather then, if, for example, you
8 have the time to try two alternative routes through a
9 corridor you may have come up with quite different rankings.

10 MR. PARKINSON: I wouldn't
11 think that the rankings would be that -- would be signif-
12 icantly different. Mr. Jenkins will add something.

13 MR. JENKINS: Just to provide
14 a little bit of perspective on the approach that was taken
15 and how the decisions were made and at what level of detail
16 the routes were going to be compared, let's look at the
17 two most important factors that were considered when we
18 tried to make a decision about what level of detail we
19 were going to investigate the corridors.

20 The first thing we have to
21 take into account is the level of the available information.
22 I don't want to flog that because it seems to be held up
23 as an excuse and I don't want that to be interpreted in this
24 particular case. It's not an excuse. The level of in-
25 formation is admittedly, inconsistent and varies sig-
26 nificantly between disciplines. The discipline with the

1 most and best coverage is geotechnical and Paul Ricker
2 has the most experience in the Yukon of all the members of
3 the team and on the basis of the geotechnical data and his
4 evaluation of the broad corridors, a first approximation
5 of a route selection, if you will, was made for each of
6 those corridors based on aerial photo interpretation and
7 his investigation on the maps and his site reconnaissance
8 wherever it would appear on geotechnical basis that it
9 might not be feasible that that first approximation to put
10 a pipeline route than alternate sub routings were inserted
11 and these were evaluated ^{as} little alternatives within the
12 major route or corridor.

13 At that level of information,
14 and at the geotechnical level they were very specific and
15 looked at, not just a corridor, but at a route. We had
16 to have a starting point. When you flew the corridors you
17 had to have something to look at, okay. So the geotechnical
18 level is the most detailed investigation of the corridors,
19 okay?

20 The next level, then I would
21 imagine, is hydrology and fish. The impacts along a
22 particular corridor would definitely vary depending upon
23 where a specific route alignment would be. There's no
24 denying that, but we will not have the responsibility of
25 selecting a route alignment for any of the corridors so
26 we were in a bit of a quandary at the beginning but anyway,

1 from that basic geotechnically selected route and some of
2 the alternates within this, hydrology and fisheries in-
3 vestigated streams that were crossed, all right. Not
4 specifically where they were crossed but just the fact
5 that they were crossed and we investigated their relative
6 sensitivity on that basis.

7 Now, in the next level of
8 detail at the wildlife level and vegetation. They were the
9 ones that most approximated a corridor evaluation or
10 comparison of the route. Partly because of the nature of
11 the discipline itself. I mean, it wouldn't make as much
12 a difference to the wildlife component if an alignment or
13 a route was on one side of a river or another as much as
14 it would for fisheries or hydrology because, let's face it,
15 from the fisheries point of view, the amount of habitat
16 that is potentially affected is, in part at least, proport-
17 ional to the number of streams that are crossed and
18 paralleled, all right?

19 But from a wildlife point
20 of view, the habitat is more, well the basic assumption
21 that it is more homogeneously distributed through particular
22 corridors/^{is} more acceptable than it is for fisheries or
23 hydrology.

24 So, there's your three, sort
25 of, gross levels of investigation of the corridors. The
26 geotechnical because of the sound data base and the need

1 to have at least a first approximation of the feasibility
2 on a geotechnical basis of a route.

3 The second level was hydro-
4 logy and fisheries which accepted that geotechnical input
5 and investigated the route, if you will, I don't want to
6 get hung up on route and corridor, there's enough
7 confusion already in hearings and the third level was
8 wildlife and vegetation. We've looked at it at a gross
9 corridor basis on particular value and so the input was
10 sort of, it accumulated from the geotechnical data base up.

11 MR. ROMAINE: Okay. I just,
12 you know, I thank you for your explanation. I'd just like
13 to pursue that a bit more to get it clear for me. Using
14 the example in the North Crooked Creek, Little Kansas River
15 area, I have to say that the Tintina Trench corridor, as
16 I understand it there is limited space between the flood
17 plain and the steep valley sides. Now, looking at your
18 analysis on the biological side and taking the approach
19 that you just explained, it would seem, and this may be
20 a hypothetical example, that for the placement of the
21 route, and I'll have to go back to the route of the pipeline
22 whether it was placed on the flood plain from your analysis
23 or the steep valley sides, there could be quite different
24 concerns. We could think perhaps of the flood plain from a
25 fish and bird point of view in this example steep valley
26 sides, perhaps also from a bird if it's raptors or something,

1 or from a mammal point of view and so that's why I'm still
2 not quite clear, even though you say you're talking a
3 corridor, there is obviously differences in there and
4 they may vary significantly over a very short distance.

5 MR. JENKINS: I agree. The
6 impacts will vary depending upon the route where the
7 alignment is. That's why we use Carl's geotechnical route
8 selection first, but, I want to add that although Carl
9 had a specific route alignment on a geotechnical basis,
10 because of the lack of consistent information for fisheries,
11 all I investigated was at this level of detail. Whether
12 or not a particular stream was crossed, I couldn't even
13 get into a consideration of how much of the potential
14 fish habitat was downstream or whether or not it would
15 really be crossed on a flood plain or up in the headwaters.
16 All right?

17 I'm not sure it would have made
18 much difference in being able to discriminate between
19 routes or corridors anyway because of the fact that the
20 data base is so inconsistent.

21 So, as an example, the
22 corridor or the route crosses a particular stream. If,
23 based on a habitat evaluation or documented information,
24 it's a known or expected Chinook migration area and there
25 are potential spawning gravels in that stream then it would
26 be given a high impact rating because of the potential for

1 damage and disrupting the migrations or habitat alteration
2 of spawning grounds or disruption of the very critical
3 overwintering areas for Chinook All right?

4 But, beyond, it may, in fact,
5 turn out that the Chinook don't spawn there, that's quite
6 possible. But because I couldn't evaluate that I ranked
7 it high anyway. Now with more site specific information
8 it might be possible to either endorse that high impact
9 magnitude rating or, in fact, reduce it. And that's why,
10 at the site specific level, we didn't consider a mitigation.

11 At the grossest level we did
12 and that comes into play when Carl, on a base of his geo-
13 technical data and experience designed a specific alignment.
14 At the coarsest level or the grossest level, that's
15 mitigation. Whether or not a route should go here or here
16 based on a geotechnical basis is really trying to minimize
17 geotechnical concern. And then based on that we evaluate
18 the sensitivity and the potential magnitude on the other
19 components.

20 MR. ROMAINE: Okay, thank
21 you.

22 MR. CHAIRMAN: Did any more
23 of your group have questions or comments?

24 MR. ROMAINE: I don't believe
25 so.

26 MR. CHAIRMAN: Mr. Klassen,

1 do you have questions or comments on the Envirocon pre-
2 sentation?

3 MR. KLASSEN: I don't have
4 any questions just now. I have a comment in the form of
5 a short prepared brief that I'd like to read into the
6 record and Mr. Parkinson will probably want to comment on
7 that in return.

8 Mr. Chairman, the Yukon
9 Wildlife Branch outlined its position on the validity of
10 a comparison of alternate corridors in the southern Yukon
11 given the present data base when we first appeared at
12 these hearings. That position remains unchanged. The
13 Yukon Wildlife Branch applauds the effort put forth by
14 Envirocon on this monumental assignment. The branch
15 appreciates what was involved having begun an evaluation
16 of the Alaska Highway route with similar time constraints.

17 It is unfortunate that the
18 press of time prevented Envirocon from consulting branch
19 files or conferring at length with staff biologists, most
20 of whom are presently out on field projects.

21 The Wildlife Branch regrets
22 the Envirocon group did not have to the time to prepare
23 a detailed document so that any conclusions could be
24 assessed by other concerned professional bodies.

25 On the basis of information
26 presented before this panel it appears that habitat mapping

1 was the main basis for evaluation of the wildlife component
2 of the various corridors. Habitat mapping is a useful tool
3 but it will only give a first approximation of where wild-
4 life will be found. It is totally inadequate in applying
5 comparative evaluation because

6 (a) All potential wildlife
7 ranges are not occupied, for example, many sheep summer
8 ranges, while promising in appearance, are vacant.

9 (b) Some species have habitats
10 that are difficult to identify, for example, winter range
11 of woodland caribou in the Yukon does not always contain
12 forests rich with arboreal lichens. Areas of apparent
13 woodland caribou winter habitat having interspersions of
14 dense and open forests and nearby escape terrain of snow
15 free areas or windblown lakes are not necessarily what they
16 appear to be.

17 The Wildlife Branch realizes
18 that Envirocon was limited to that segment of these corridors
19 that lies within the Yukon Territory. The panel must
20 consider, however, that no recommendation of a corridor
21 can be made in isolation from the Alaska and British
22 Columbia situations. The three northerly alternates would
23 appear to cross winter range of the Steese Fortymile
24 caribou herd, an international population. This factor
25 must also be weighed and, with respect to that, Mr.
26 Parkinson tells me that they did consider that and he will

1 no doubt elaborate on that later.

2 On the basis of inadequate
3 information within the Territory and in the absence of
4 consideration of the corridor's impact outside the Yukon,
5 the Wildlife Branch must continue to question validity of
6 any corridor comparison and recommendation.

7 And, in addition to that,
8 I'd only like to comment on one of those things that Mr.
9 Jenkins said and the -- that is that the impact on wildlife
10 in a corridor can vary, in my opinion, substantially de-
11 pending on which side of the river the route will be --
12 as an example, on the yellow line there, the Tintina/Liard
13 route, we know, given the limited information that we have
14 on the distrubution of wildlife populations in the territory
15 that along the Hoole Canyon, or the -- not the Hoole Canyon
16 but the Hoole River itself, there exists a goat population
17 and depending on whether the route is one one side or the
18 other of the Hoole River, it could make a substantial
19 difference in the impact on that population.

20 MR. CHAIRMAN: Thank you.

21 Before I ask Mr. Parkinson to comment, do any of the
22 panel members have questions? Well, Mr. Parkinson, would
23 you like to comment?

24 MR. PARKINSON: Yes. Mr.
25 Chairman I'd like to just comment as follows. We appreciate
26 very much receiving Mr. Klassen's comments. Without the

1 excellent cooperation that we've had with our contacts
2 with the Wildlife Branch our results might be much less
3 credible. We understand entirely what he's saying because
4 I think it's reasonably fair to say that we would have
5 preferred time to confirm the confidence levels of our
6 data, however, we weren't offered this privilege.

7 With respect to his remark
8 about the detailed document. I'd like to pass on the word
9 that we are working on a report which will be available
10 before the end of July, in Whitehorse and you'll be able
11 to follow through the assessment and you can try putting
12 your own values on it and see if you agree or disagree.
13 It will all be there.

14 MR. KLASSEN: We'll look
15 forward to receiving that. Thank you.

16 MR. PARKINSON: While our
17 presentation yesterday may not have been too explicit in
18 all of the elements that the such as the Steese Fortymile herd that
19 were taken into account, we have a list of environmental
20 sensitivities that include the Fortymile -- Steese Forty-
21 mile Herd, to the extent that we have information available
22 that were considered in our assessment.

23 Then I think this last point
24 that I would make here, the Wildlife Branch must continue
25 to question the validity of any corridor comparison and
26 recommendation. I would certainly hope they would. In

1 my view they'd be remiss in their responsibilities and
2 duties if they did not take this position. It just gives
3 us confidence to know that our wildlife resources are in
4 hands that are responsible.

5 We have been rather careful
6 to avoid making recommendations at this stage. We realize
7 the waiting that is going into-that could possibly be
8 attached to the evaluation that we've made and before we
9 reach the position where we make any kind of a really firm
10 recommendation we want to have had the opportunity to check
11 to the extent we can, the work that we've done.

12 So, I think there's a comment
13 that I would like Dr. Guthrie to make with respect to the
14 adequacy or inadequacy of the techniques of applying map
15 comparisons for habitat. Thank you.

16 DR. GUTHRIE: Yes. I'm
17 referring specifically to the sentence which reads, "It
18 is totally inadequate in applying comparative evaluation."
19 A comparative evaluation can be applied at any level of
20 data. One does not in fact have to have any firm data
21 at all to compare things. One can compare things out of
22 absolute ignorance. And, in the past, in fact, some very
23 basic decisions have been taken in this way. We're trying
24 to move as far up the scale from ignorance towards knowledge
25 as we can within the constraints.

26 On that basis, I feel that our

1 comparison is valid. It must be kept in mind, as the Wildlife
2 Branch has pointed out, that the conclusions one draws are
3 only as good as the data one has. And on that basis, Mr.
4 Klassen is quite correct in questioning it but I disagree
5 with the wording that it is inadequate. There is never
6 adequate data.

7 In the field of economics
8 they use the point of the diminishing marginal returns,
9 for instance, to decide when to quite putting additional
10 increments into a system. We do not have any such clearly
11 defined point which we can identify in an objective basis
12 as to when there is an adequacy of information so if we
13 had ten years of data one could still say there is not
14 adequate data and probably would be quite correct in saying
15 so. So, we are working on a scale of adequacy and I think
16 that is a point which must be kept in mind.

17 MR. CHAIRMAN: Thank you
18 Dr. Guthrie. Would you like to rejoin, Mr. Klassen?

19 MR. KLASSEN: A couple of
20 words. I appreciate the complimentary comments Mr.
21 Parkinson made concerning the Wildlife Branch. I'm sure
22 that others in the Branch will also. I realize, also, that
23 no firm recommendation has been made by Envirocon of any
24 of the routes but I'm afraid that when a number is put --
25 a number value is put on a route and one route gets a
26 higher number than the other then that may be construed as

1 a recommendation and I'm glad that he clarified that point.

2 Concerning what Dr. Guthrie
3 has said, perhaps my choice of words was unfortunate. I
4 realize that a comparison can be made at any level of
5 information and I grant him that, but, if too much weight
6 is placed on the comparison then the comparison does not
7 accomplish what I hoped it was set out to do in this case.

8 MR. CHAIRMAN: Thank you.
9 Mr. Hernandez do you have any comments? Mr. Bouckhout
10 do you have any comments on the -- Foothills stands willing
11 to go anywhere, eh?

12 MR. BOUCKHOUT: Anything
13 within reason. Sorry about that. We have with us tonight
14 two people representing the YTG Parks and Federal Parks, I believe,
15 and they've asked if they could present a quick brief.
16 Mr. Bruce Harvy and Mr. Ron Hutton, are you here and would
17 you like to present your document? If you'd like to have
18 a chair anywhere along the line there, that's fine.

19 MR. HARVY: Thank you. In
20 the absence of Mr. Don Hutton who represents the Territorial
21 Parks and Conservation Branch, I will attempt to nothing more
22 than draw the panel's attention to concerns that we have
23 about certain areas, the Yukon River, Dawson City. I'll
24 read it as we agreed to present it, in a very modest way.
25 If you will.

26 The Yukon River forms an

1 integral part of the international gold rush trail which
2 leads from Skagway to Dawson City. As it exists today,
3 the trail is probably the single most important historical
4 and geographical feature of the territory. Over one
5 dozen government agencies at local, national and inter-
6 national levels have indicated their desire for wise
7 management and protection of this historical resource.
8

9 At the same time, the gold
10 rush scene is probably the most important and widely known
11 aspect of the Yukon and may be considered as the foundation
12 of Yukon's tourist industry. Both Parks Canada and the YTC,
13 have and are expending considerable efforts and funds to
14 both protect and restore and interpret this aspect of the
15 gold rush and in particular, the Yukon River as a
16 former transportation corridor. Evidence of this can be
17 seen in Dawson City and on the stern wheelers located in
18 Carcross, Whitehorse and Dawson City.

19 Today the Yukon River is
20 becoming increasingly popular for recreational aspects.
21 Approximately two thousand people travelled down the river
22 from Whitehorse to Dawson City last summer and the numbers
23 are expected to increase. An activity which has the
24 potential to detract from, mar, or destroy any portion of
25 the Yukon River as a historical and a recreational resource
26 should not be tolerated.

With regard to Dawson City

1 and the gold fields. Parks Canada has a major historical
2 development plan for Dawson City and the gold fields which
3 involves some twenty five million dollars to be spent over
4 the next fifteen to twenty years, to preserve, to restore,
5 reconstruct, and interpret the Klondike Gold Rush of 1898.

6 Although pipelines are
7 environmental damage, are certainly part of the gold rush
8 story, any modern major unalterable intrusion into this
9 historical area would certainly not be favourably accepted
10 by Parks Canada. That's it. Thank you.

11 MR. CHAIRMAN: Thank you.
12 Would you answer questions on your presentation?

13 MR. HARVY: I will, certainly.

14 MR. CHAIRMAN: Does the panel
15 have questions. Mr. Trevor.

16 MR. TREVOR: When we've been
17 looking at the Yukon River portion of the Gold Rush
18 Park in earlier evaluations there was a very strong object-
19 ion on the part of the Parks and Historic Sights to anything
20 on the fringes of the river. For example, a road, a new
21 road which could be seen from the river itself. And in
22 terms of the Klondike routing, that's one of the alternatives.
23 We could be running into this factor between Minto and
24 Carmacks. Is this still a very valid consideration in terms
25 of the Gold Rush Park that you wish to keep the view from
26 the river in as near as possible to the view that it had

1 seventy years ago?

2 MR. HARVY: Yes. This is --
3 I don't know just how many of you are familiar with the
4 entire Parks Canada proposal and we're just in the position
5 now of going into a consideration of an ARC program which
6 comes under the umbrella of Parks Canada and the ARC
7 program, as most of you maybe are aware, is an agreement
8 for recreation and conservation between Parks Canada and
9 the province or territory. And in this case we feel, quite
10 justifiably I think, that this program would fit the Yukon
11 River waterway from the headwaters at Bennett to Dawson
12 City and as an international part of it, on to Eagle and
13 any such intrusion of that nature would certainly not be
14 more than welcome by us.

15 We have had, in the past,
16 some of these kind of intrusions that certainly don't
17 lend to good aesthetics for the river travellers. I would
18 hope that the pipeline would not, for instance, parallel
19 or cross too frequently, such a waterway. I think, too,
20 we do have a concern too about right at Dawson City and
21 the gold fields there coming into the Klondike Valley,
22 and I daresay that with the modern methods and means that
23 it could be done and be rehabilitated to its historic,
24 distorted way it is now but it is a concern nevertheless.

25 MR. TREVOR: In this
26 appreciation for example, the tailings piles at Dawson, is

1 that a factor too in a sense that one wishes to retain those
2 in their present form?

3 MR. HARVY: It is amazing
4 how quickly, in the last nine years that I've been here,
5 how many of the tailings piles are disappearing from the
6 normal way they were deposited and I think anyone,
7 particularly the pilots of the area, notice it more definitely
8 in the winter time when they fly over and they can't see
9 the ripples like they did a few years ago.

10 Through road construction,
11 the relocation of the highway down the Klondike Valley,
12 which is all made out of tailings, the impact of the
13 story of dredgings, the YCGC's activities in the gold
14 fields is very quickly disappearing. It's unsightly but
15 it's the story to be told and we are certainly going to
16 try to preserve some of the tailings the way they were
17 deposited in Park Ridge deposit. But, yes, it would be
18 a little awkward to deposit them back again the way they
19 are now. I would say.

20 MR. TREVOR: You have a
21 specific development at Bear Creek. Perhaps you could
22 give us a little more detail on that in terms of what
23 area does that proposed development cover. Does it come
24 right out to the road and just how much of that area do
25 you want to preserve?

26 MR. HARVY: The Bear Creek

1 location is about some sixty acres there right at the YCGC
2 camp and the total story of gold mining will be interpreted
3 there, including a dredge, put in a dredge pond at Bear
4 Creek. I don't want to get into this story and dwell on
5 this too greatly but we do have such as the gold room to
6 interpret the processing of gold and we would intentionally
7 set up interpretive displays depicting the different methods
8 and means of placer mining particularly, right from the
9 shovel and the gold pan and the old hand rocker, right up
10 to the gold dredges that were used up to the 1960's.

11 As well as that on, of course,
12 Bonanza Creek, and where such a line may cross Bonanza
13 Creek it's hard to tell right now, I'm sure. But, again,
14 we have Discovery Claim and the number four dredge site
15 on Bonanza Creek that certainly we wish to protect those,
16 too.

17 Again, further up at the
18 confluence of Eldorado and Bonanza is the old town site
19 there of Bonanza town site or Grand Forks. There hasn't
20 been any archeology done in that area or exploration of
21 any kind to define if there is much of anything other than
22 a few old graveyards and so on but I would want to caution
23 too that in such construction that there would be a care-
24 ful watch for graves deposited. You can find them any-
25 where along the gold creeks right on the edge of the road
26 where the grader blade just misses a head marker. I think

1 it's important that these things be watched for on any
2 kind of development.

3 MR. TREVOR: Thank you.

4 MR. CHAIRMAN: Any other
5 panel members have questions? Any of our advisors have
6 questions? Mr. Klassen.

7 MR. KLASSEN: One question
8 Mr. Chairman. In Parks Canada efforts to maintain the
9 tailings or the dredge tailings piles in their original
10 or approximating original condition do you intend to cut
11 back some of the moose browse that's starting to grow on
12 them now after seventy odd years?

13 MR. HARVY: No, I wouldn't
14 think so but these are certainly -- have an impact and the
15 growth that has in the natural recovery there is just
16 tremendous in the last nine years that I've seen. They
17 were bare when I came here nine years ago and you can see
18 trees that are twenty feet high in them now.

19 No, I wouldn't think so,
20 not at all. If people can even walk through this and see
21 it I would think that the deposited soil in these huge
22 arcs as they are and ridges is evidence enough of what
23 had happened. I wouldn't certainly want to destroy what
24 recovers on it.

25 MR. KLASSEN: Thank you.

26 MR. CHAIRMAN: Any other

1 questions or comments from panel staff, floor? I can help
2 but think that a person in your position would be a great
3 benefit to President Carter now that they're entering a
4 debate on strip mining. Thanks very much.

5 MR. HARVY: Thank you.

6 MR. CHAIRMAN: Mr. Romaine
7 would you like to present any advice to use on alternatives
8 in the southern Yukon?

9 MR. ROMAINE: Yes Mr. Chairman,
10 we'd like to read our brief into the record. Following
11 that, I believe at least Mr. Lyons and Mr. Emslie have
12 some comments and perhaps questions to make. We also have
13 people available here, again experts, if there are
14 specifics that you want to pursue. With respect to the
15 alternatives we did make a sort of an introductory statement
16 related to the Dempster on the lack of information and in
17 most cases the problems with not having an alignment or a
18 route selected thus making the geographic area at this
19 stage larger to look at.

20 I'll run through our comments
21 quite quickly. For the Tintina Trench corridor, it is
22 thought that it will be difficult to determine possible
23 pipeline alignments in selected areas due to the rugged
24 terrain and stream crossings to be encountered. Examples
25 are in the North Crooked Creek, Little Kansas River area,
26 where there are concerns relative to the very limited space

1 between the flood plain and steep valley sides in which a
2 pipeline may be placed. Along the Pelly River from the
3 Earn River confluence to Faro, the flood plain is en-
4 trenched in steep unstable banks. Any proposed stream
5 crossings in this section are likely to cause problems with
6 slumping erosion and increased siltation.

7 The Pelly River and all it's
8 tributaries are important Chinook salmon streams. In
9 general, because the route is closer to the headwaters
10 of the streams, the degree of interface between the southern
11 Tintina Trench route and the fisheries resource is likely
12 to be much less than with the Robert Campbell Highway
13 route.

14 Little data is available
15 for fish over wintering sites, spawning and the rearing
16 areas. Because these concerns are site specific and
17 because a route alignment has not been selected, it is
18 difficult to identify the extent and degree of concern
19 in relation to the fisheries resource.

20 The vegetation in the Tintina
21 Trench corridor in general appears to be capable of healing
22 rapidly providing stabilization of banks is implemented.
23 The vegetation of steep banks, particularly in the Wood-
24 burn Creek Little Kalzas River area may be a problem due to the
25 relative dryness of the region and that fact that when it
26 occurs, precipitation is intense coming mainly in the form

1 of thunder showers. The prime concern is that a major
2 access road, or a major access road would be required in a
3 large portion of the Tintina Trench. If the Robert Campbell
4 Highway were utilized for the southern section the northern
5 part of the trench route along the Pelly River would still
6 require major road construction. These access roads are
7 likely to have impacts on vegetation, drainage patterns,
8 wildlife, water quality, and the fisheries resource and
9 we've had discussion on that today already.

10 There are concerns related to
11 compressor stations, storage sites, borrow pits, construction
12 camps, water supply and waste disposal which are site
13 specific. It is difficult to elaborate on these concerns
14 until the sites have been designated. There's little
15 climatic data for this alternative thus no evaluation
16 of compressor sites could be made, even if locations were known.

17 In general, concerns relate
18 to wildlife disturbance through the noise emanating from
19 compressors and to winter ice fog formation near highways
20 as a result of water vapour emissions. Very little information
21 is available for migratory birds along this corridor.
22 From preliminary observation it appears that the wetlands
23 in the Dodo Lakes Liard River area, the wetlands in the
24 Ross River region and certain areas along the Pelly River
25 have waterfowl capability.

26 Tintina Trench is believed to

1 be a major flyway for Sandhill Cranes, swans and Canada
2 Geese. General concerns are direct loss of habitat,
3 impairment of habitat, and disturbance during construction
4 and operation. In very broad terms, the Campbell Highway
5 route would appear to have less impact on the migratory
6 bird resource than a route along the southern Tintina
7 Trench which passes through the Liard River Valley.

8 A unique area in the Tintina
9 Trench which should be identified as the McArthur Game
10 Reserve, northwest of the Little Kalzas River .With respect
11 to the Klondike Highway Corridor, geophysical concerns
12 along the route relate mainly to bank and channel bed
13 stability and intermittent permafrost. Slope stability
14 may be a problem in the alluvial and Lacustrine materials
15 along the Yukon River between Carmacks and Minto and there
16 is some evidence of extensive slumping in some of the
17 areas.

18 Also a problem along high
19 and steep banks along the meandering Bradel(?) Stewart River between
20 Stewart Crossing and Slough Creek and at the Flat Creek
21 Klondike River confluence where bank undercutting is common
22 The possible increase in suspended sediment and organic
23 material could aggravate low dissolved oxygen levels during
24 discharge under ice cover.

25 Terrain instability, particularly
26 in permafrost areas will require special care and design.

There is comparatively little meteorological data available for this corridor, and thus, no detailed evaluation of compressor sites concerns can be made. A major concern relates to the formation of ice fog in winter as a result of water vapour emissions and its consequent effect on highway traffic and possible construction of maintenance air fields which may be located adjacent to compressor stations.

Also of major concern is noise disturbance to wildlife and human habitation due to

1 the operation of compressors. Very little data is available
2 for migratory birds along the Klondike route, however,
3 large numbers of water fowl were observed from the south
4 end of Lac Laberge, north along the entire route. Areas
5 of particular note were the Twin Lakes area, Nordenskiold River,
6 north of Carmacks along the west side of the Yukon River,
7 along Wilsek Lakes and the Willow Creek area. General
8 concerns relate again to direct loss of habitat, impairment
9 of habitat and disturbance during construction and operation.

10 That is a summary statement
11 Mr. Chairman and as you will recall it has been discussed
12 again. We did identify from one point of view, another
13 alternative corridor from Carmacks to Faro. We certainly
14 haven't looked at that either from all agencies' point of
15 view.

16 MR. CHAIRMAN: Thank you
17 very much, Mr. Romaine. You detailed the concerns on each
18 route. Did you at all compare the concerns and get an
19 impresssion of relative concerns along the routes?

20 MR. ROMAINE: We have not
21 made a comparative analysis between the routes. I think
22 as has been expressed before, one of the concerns is the
23 deficiency in data to allow that to take place.

24 MR. CHAIRMAN: Okay, any
25 questions from the panel? Any questions from the
26 advisors? Do you have any comments Mr. Parkinson?

1 MR. PARKINSON: Well, I'm
2 a little disappointed we haven't got a comparison to talk
3 to. It appears that they have about the same data base
4 that we have and it would have been quite interesting to
5 have had a comparison.

6 MR. CHAIRMAN: The specific
7 problem areas especially are the slump areas that were
8 suggested as concerns and the tight squeeze. Were these
9 also concerned to your evaluation teams?

10 MR. PARKINSON: Very much so.
11 Very much so.

12 MR. CHAIRMAN: Are there any
13 further questions for Mr. Romaine? Panel staff? Dr.
14 Schilder?

15 DR. SCHILDER: Mr. Chairman,
16 I had a question for Mr. Romaine. You have spent a
17 considerable time on comparing various alternatives in
18 detail. Which alternative you would prefer, at least from
19 the point of view of indications for the best route from
20 the point of view of mitigating measures which would be
21 used to reduce the potential environmental impact?

22 MR. ROMAINE: I'll have to
23 confer on that but I don't believe that we can answer that
24 at this stage. Our impression and our understanding, I
25 believe, in coming forward to this session was to identify
26 our concerns, to provide as much information as we had on

1 the alternate and we really haven't gone to the depth of
2 analysis for the corridors as perhaps you've anticipated
3 that we should have done.

4 DR. SCHILDER: Excuse me,
5 another question. Have you identified any environmental
6 issues that could possibly justify a decision that a pipe-
7 line should not be built along any of these discussed
8 alternative routes? For environmental reasons of course.

9 MR. ROMAINE: I think it
10 depends on how you approach the problems. First of all
11 I think that we've indicated, I want to stress again, the
12 lack of information in a number of areas to make a general
13 statement like that and I assume that that's part of the
14 function of bring those points to the fore. Again, I
15 think, when you raise the question, a lot of it depends on
16 what's being proposed and the terms of the design and the
17 mitigation measures that are built into it.

18 If I could take a minute
19 before I answer that question.

20 MR. BOUCKHOUT: Excuse me
21 Mr. Chairman. While Mr. Romaine is working on that one
22 I'd just like to make one comment. I heard from at
23 least one speaker and perhaps more than one that in consider-
24 ations of concerns they talk about air strips at compressor
25 stations. There are no air strips proposed at any
26 compressor stations. Just a point of clarification.

1 That includes the filed route along the Alaska Highway.

2 MR. CHAIRMAN: Thank you.

3 reached

MR. ROMAINE: I believe we've

4 /a concensus Mr. Chairman. I think that our position at
5 this stage would be again, that in view of the data base
6 and in view of the unknowns as to the proposal again, that
7 I don't think that we can make a clear cut statement at
8 this stage as to the acceptability or nonacceptability of
9 routes or one route over another and I assume that that
10 is really a function at this stage for the panel to handle
11 in terms of what they decide to do with them and what they
12 feel should be done in terms of future studies, et cetera.

13 MR. CHAIRMAN: We're always
14 looking for good advice.

15 MR. ROMAINE: I just provided
16 guidance as to things to do.

17 MR. CHAIRMAN: I believe the
18 question was, and maybe this is a question to any of our
19 advisors. Are there any areas along any of the routes
20 which, in your opinion, would rule out the construction
21 of a pipeline along any of those routes, acknowledging
22 that, in fact, in time to come, some of these areas may
23 appear because of lack of data at the present time.

24 MR. ROMAINE: Maybe I'm
25 getting way out of my depth on this but the kind of answer
26 that I personally would like to give on that I think

1 relates back to a lengthy of discussion we had one some
2 of the problem areas and some of the corridor alternatives
3 also take those problem areas in and the statement that
4 we made that it really wasn't clear at this stage, what indeed
5 was being proposed there? Obviously there was problems with
6 the present alignment and from my point of view again I
7 would think that the problems were severe enough with the
8 proposed alignments to seriously question whether, indeed,
9 they could be handled through design and whether, indeed,
10 you would accept as a group perhaps, the acceptability of
11 alignment there. Hence, the discussion on alternative
12 routes as a mitigation in those problem areas. And
13 I think that that is the kind of answer that we have to
14 make on some of these. It really depends on the selection
15 of the alignment or alignments in some cases. We've
16 identified the problem but certainly the magnitude of
17 the problem isn't clear at this stage.

18 MR. CHAIRMAN: Thank you.

19 Anybody else like to comment on that?

20 MR. PARKINSON: Mr. Chairman,
21 in response to your question about areas that would clearly
22 rule out any particular alternative, we really didn't
23 feel that there were any such situations on the alternatives
24 that we examined.

25 MR. CHAIRMAN: Thank you.

26 Anyone else wish to comment.

Mr. Hernandez
Mr. Lister
Mr. Klassen

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1 MR. HERNANDEZ: I'll just
2 reiterate what Mr. Templeton stated last night. He outlined
3 his readings for the position but he did -- sorry, the
4 Alaska Highway Pipeline Panel, has concluded that
5 an acceptable route can be found for a gas pipeline with
6 the southern Yukon corridor as they defined it from
7 considering all four of those routes I guess or anything
8 in between those. Again, with the proviso that if the
9 government's ready to control it, so that, in their opinion
10 a pipeline, a gas pipeline route can be found in the corridor
11 and mitigation is necessary. Some of the alternate --
12 if the Alaska Highway route, for example, were to be chosen
13 some of the mitigation might mean rerouting out of things
14 like the Ibex, , or following the highway right to Squanga
15 Lake and those are some of the mitigative measures which
16 have to be evaluated but, in their opinion, it can be done.

17 MR. CHAIRMAN: Thank you.
18 Mr. Lister, you had a question?

19 MR. LISTER: Not at this
20 stage.

21 MR. CHAIRMAN: Any questions
22 for Mr. Romaine from the floor? Mr. Klassen, would you
23 like to advise us on alternate routes?

24 MR. KLASSEN: Mr. Chairman,
25 the Wildlife Branch doesn't have a prepared submission
26 on these alternate routes. We've stated our position on

1 alternates. We haven't had the time to look at them. I
2 was just jotting down a few notes here to give you an idea
3 of some of the concerns that we have and these are just the
4 ones that I can recall as I sit here and aren't necessarily
5 the main ones because the Game Management Zones that we
6 have censused to date for sheep populations are in the
7 western/southwestern part of the territory. A sheep census
8 is currently underway in the southeastern extent of the
9 Pelly Mountains which the Tintina/Liard corridor would
10 go through.

11 On all three of the northerly
12 routes, as I said earlier, we are concerned about the Steese
13 Fortymile herd. We advised the Alaska Department of Fish
14 and Game of the National Energy Board's recommendation
15 and until a member of our staff made them aware of it
16 they hadn't heard about it and Dick Bishop, who is the
17 regional supervisor for the -- in the Fairbanks office
18 said that we could quote him as being gravely concerned
19 about the possibility of a pipeline corridor through that
20 Steese Fortymile caribou range. The Steese Fortymile herd
21 consists of four to six thousand animals. The Alaskans
22 have much better data on that herd than we do and their
23 range, apparently, extends from, let me just refer to a
24 piece of paper I have here. Major wintering areas from
25 Dawson on the east to the Taylor Highway on the west which
26 isn't shown on that map, unfortunately, the Taylor Highway

1 is in Alaska and extends northward into the Ogilvie Mountains
2 where this herd may intermix with the Porcupine caribou
3 herd. A few of these caribou, apparently, remain in the
4 vicinity of the Taylor Highway into late winter and may
5 range as far south as the Alaska Highway.

6 The fall migration occurs
7 regularly in September and November with most of these
8 animals moving east across the Taylor Highway in October.
9 That concern would apply to all three of those routes.
10 Then coming down the Klondike route because of its
11 proximity to the Yukon River and some of the raptors,
12 cliff nesting raptors along that waterway we would have
13 concern there. We have recently been advised by residents
14 of Pelly of a movement of woodland caribou in that area
15 that apparently is regular enough so that they hunt it
16 in that -- in the vicinity of the Alaska Highway on a
17 regular basis, on a regular annual basis and there are
18 small sheep populations between the Alaska Highway and the
19 Yukon River in the Minto area and I hesitate to say that
20 because of their accessibility.

21 The concerns that we have
22 along the Tintina/Liard route are the same up to the
23 junction as with the Klondike route and then continuing
24 from there the Tintina/Liard and Tintina/Campbell routes
25 both run across the southwesterly boundary of the McArthur
26 game sanctuary. There are sheep populations on both sides

1 of the Pelly River in the Anvil range and in the Glenlyon
2 Range. There are goats, referring now to the Tintina/Liard
3 route, there is one goat population that we are aware of
4 in the St-Cyr Mountains on the southeasterly end of
5 the Pelly Range and sheep as well in the Saint-Cyr Mountains
6 then when that corridor breaks into the Liard Basin it
7 enters some of our better moose winter habitat. There
8 are also, in the case of both the Liard/Tintina and
9 Liard/Campbell routes, deer populations between Faro and
10 Ross River along the Pelly and also further to the west
11 along the Pelly towards the Yukon River. These deer are
12 not very numerous, by the way, we don't have good figures
13 on them but the conservation officer in Ross River told
14 me that this winter he'd counted twenty six between Ross
15 and Faro and that's probably the best number that we've
16 had.

17 The Tintina/Campbell route
18 had, diverging from the Tintina/Liard route at Ross River
19 encounters woodland caribou habitat in the vicinity of
20 Finlayson Lake. These caribou cross the Campbell Highway
21 there from the northerly to the southerly side in mid-
22 winter and then on the basis of information from local
23 people, return later in the winter going the other
24 direction.

25 Those are the only comments
26 that I have jotted down here. On the basis of these concerns

Mr. Klassen
Mr. Hernandez
Mr. Bouckhout
Mr. Kosten

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1 we can't give you a comparison. The Liard/Tintina area,
2 of course, gives us the greatest amount of new access and
3 as we've expressed on the Alaska Highway route, that is
4 something that we are quite concerned about.

5 MR. CHAIRMAN: Thank you
6 very much. Mr. Hernandez?

7 MR. HERNANDEZ: I have nothing to add

8 MR. CHAIRMAN: Mr. Bouckhout,
9 what are your thoughts on alternatives?

10 MR. BOUCKHOUT: I think,
11 initially, Doctor Hill, Mr. Kosten has some comments to
12 make regarding the Tintina alternate. He has carried
13 out reconnaissance flights on more than one occasion.

14 MR. KOSTEN: Well I guess
15 in
16 I'd have to say/my comments here I would commend Envirocon
17 for their assessment of the various routes, possibly for
18 different reasons. The Tintina alternate, while it may
19 appear to be an attractive alternate from the standpoint
20 of mileage, we have to take into account the fact that we
21 have to build a pipeline through there and for all the
22 various other reasons that have been given in a negative
23 sense on this route we starting flying down the route and the
24 general configuration of the valley is that you have a
25 meandering river across the entire valley from one bank
26 to the other. From there you go into rather steep slopes
on either side. The objective of building a pipeline through

1 such an area is that you have to consider that you have to
2 get your materials in. This is a rather formidable task
3 in an area such as what we are considering.

4 You must have access of some
5 sort to get basically, your pipe in and all of the rest
6 of the materials and aesthetics and everything else being
7 what they are, a construction job is a construction job.

8 The alternatives are as
9 follows.

10 One. You go down the valley.
11 You have numerous river crossings because it's a meandering --
12 the Pelly River is a meandering stream from the junction
13 point down to about the vicinity of Faro, which is a
14 distance of approximately one hundred and ten miles or
15 thereabouts. This requires either going down the valley
16 you -- river crossings that I think I stopped counting
17 after I reached twelve, from the standpoint of the fish
18 aspect of it and so forth, the prospect of this is rather
19 staggering. It virtually rules out going down the valley
20 and crossing all of the -- making all of the stream crossings
21 that are necessary from a good engineering and design
22 standpoint.

23 The alternative to that
24 is going up onto the hillside and there is a, really,
25 in our assessment, was no in-between point, no compromise
26 point. You're looking at grading a ninety foot or there-

1 abouts right of way, virtually for one hundred and ten miles
2 into the hillside. This, I don't think, has been, and I
3 stand corrected, I don't think it has been considered in
4 this location but this is what the facts of life are
5 because you've got to get access, you've got to get your
6 materials in, basically your pipe from either one end or
7 the other.

8 As a result of this reconnais-
9 sance , we recommend to our management that we reject
10 this route for this purpose because it involves massive
11 earth moving projects in order to be able to establish
12 a grade that is approximately ninety feet wide in order
13 to be able to account accomodation of the construction of
14 a forty eight inch pipeline.

15 Basically this is a bird's
16 eye view of that and as a result of this we rejected the
17 entire route.

18 The second alternative to
19 that is the Carmacks, following the highway from Carmacks
20 west. The same conditions essentially prevail. There is
21 no valley there that you can put it into. You run into
22 the lake and there is no room. You have the same condition
23 of going up onto the hillside and grading yourself for
24 approximately the same distance and in most cases blasting
25 the right of way out of the solid rock. Certainly there
26 may be other factors that would govern this but from the

1 standpoint of installing a line in these areas, when there
2 is a better alternate led us to the conclusion that if the
3 Dawson alternate is the alternate chosen and there are
4 indications that this is a desirable route, then this is
5 the much preferable route to going via either the Tintina
6 Trench or the Carmacks alternate.

7 MR. CHAIRMAN: Thank you. Do
8 panel members have any questions?

9 MR. KOSTEN: I'm sorry, one
10 of the gentlemen said he wasn't quite sure which route
11 I was talking about. I'm talking about the yellow line
12 route and the same comments that applied to the Tintina
13 Trench apply to the Liard River because you don't have
14 access in there and you've got to be able to get your
15 materials in and you have virtually the same problem there.
16 Following the yellow line all the way down.

17 MR. CHAMBERS: Would you
18 like to make you comments on the Klondike route, on the
19 Blue route, to sort of include the three alternatives.

20 MR. KOSTEN: The Klondike
21 route has the advantage that it is, for the most part,
22 where the two lines join-- there is an area through there
23 that is a little soft. It's a little swampy and we would
24 consider this section of the route for winter construction.
25 It's approximately an area of about forty to fifty miles.

26 The balance of the route is

1 a very good pipeline route from the standpoint of installa-
2 tion, and operation, and maintenance.

3 MR. CHAIRMAN: Mr. Trevor?

4 MR. TREVOR: In discussing
5 the Tintina Trench and the Carmacks route you were talking
6 about the room to manoeuver, if I could put it in those
7 words, so, how would then you comment on the area around
8 Stewart Crossing on the Klondike Highway?

9 MR. KOSTEN: I'm sorry, I'd
10 like to look at a map here to refresh my memory. Context
11 Mr. Trevor, are you asking a question?

12 MR. TREVOR: Well, the high-
13 way, for example, is on the north side of the Stewart and
14 then crosses the Stewart at Stewart Crossing. If one is
15 following the highway down then one is on the north side
16 of the river and when you come around the mountain there,
17 just before where the road crosses the river, there's
18 hardly any room to manoeuver at all.

19 MR. KOSTEN: We go on the--
20 the
21 at least our proposed route at /moment, and this could be
22 subject to change--as going west of Stewart Crossing,
23 crossing the highway south of Stewart Crossing and then
24 going to the west side of the river in that area.

25 MR. TREVOR: So where would
26 you propose to cross the Stewart River to get on the west
side of it?

1 MR. KOSTEN: I'm sorry, I'm
2 going to need another map here.

3 MR. TREVOR: It's okay, we've
4 got a map now which shows your crossing just south of
5 McQuesten.

6 MR. KOSTEN: That's correct.
7 Which is a fair crossing. The banks of the river are
8 not onerous at all they're -- it appears to be fairly stable
9 in that area. I might, I guess make the comment that the
10 route selection in this, well, throughout the whole area,
11 is on the basis of preliminary route and what we would
12 do in the final design stage is cruise out in the field
13 to make the final location. They would have to select
14 the river crossing based on the known soil information,
15 the type of conditions we would encounter. We are not
16 really at that stage at this point. The river crossings
17 would govern the locations to a certain extent when we tie
18 them in.

19 MR. TREVOR: Yeah, we under-
20 stand that this is a very preliminary --

21 MR. KOSTEN: Right.

22 MR. CHAIRMAN: Any other
23 questions from the panel? Dr. Hughes?

24 DR. HUGHES: You mentioned
25 the objection of some steep side hill on that, say,
26 Tintina/Campbell Highway route, but have you compared that

1 in length and difficulty with the side hill routing that
2 you have along Marsh and Teslin Lakes, along portions of
3 Swift River, Rancheria River, in getting what you would
4 avoid entirely. It seems to me that although this may be
5 a factor with respect to one route, it's the route that has
6 been explained to us best and that all the panel has seen
7 that there seems to be a fairly high level of steep hill
8 slope, rock cuts, and so forth, on the route that you're
9 preferring and I'm wondering if there has actually been
10 any attempt, I presume you haven't had time to make any
11 kind of mile to mile comparison but do you have a feel
12 for, you know, sort of what the give and take is on that?

13 MR. KOSTEN: You're correct
14 in that we haven't really made our mile by mile comparison.
15 We have made overall order of magnitude comparisons. The
16 basic difference, I guess, I would have to say is the fact
17 that you have access. The area south of Whitehorse does
18 have some tight spots in it but you're within shouting
19 distance in most cases of the highway which is a route
20 for bringing in your material and this makes an awful
21 difference to any route, for that matter, anywhere.
22 I couldn't give you specific indications of a mile to
23 mile basis, you're correct in stating that but, in the
24 gross sense we have looked at both alternates including
25 the area south of Faro and if you put the figures
26 together, the routes that we are recommending are the ones

1 that went out and this is why we are recommending them.

2 DR. HUGHES: This, by the way
3 is a little different attitude to what I recall being
4 expressed in the Mackenzie Valley pipeline hearings where
5 the evidence was that the Canadian Arctic Gas didn't care
6 much one way or the other whether the Mackenzie Highway
7 was built to provide them access. You do weigh heavily
8 having highway access.

9 MR. KOSTEN: If you can't
10 get to it you can't build it sir.

11 DR. HUGHES: Yes, I did find
12 that particular attitude puzzling in the Mackenzie Valley
13 case.

14 MR. KOSTEN: Well, our assess-
15 ment, quite frankly, of the overall impact, if you wish, of
16 the effect of not having year round access by whatever mode
17 it might be, in the analysis, and we had transportation
18 consultants spend about a year and a half, and even they
19 were confused in the first instance to a degree. But,
20 in the ultimate analysis, our transportation system costs
21 more than the pipeline. Including the steel.

22 DR. HUGHES: Thank you very
23 much.

24 MR. KOSTEN: Well, I guess
25 the summation of it would be that if we consider the
26 various alternates, technically any of them are feasible

1 from a technical standpoint. It becomes a question of
2 dollars. If you had to build the route of any of these
3 lines it could be done. It is a situation that you do
4 run into terrain in other parts of the Yukon where it would
5 be practically impossible. Any of these routes are
6 technically possible to construct. It's a matter of picking
7 out the path of least resistance here and this is what the
8 impression that we're trying to create that we're looking
9 at the best route from the standpoint of installation and
10 I should admit that we're not, at least from the comments
11 that I have made, it is not relating to the environmental
12 or other socio-economic or any other concerns. What I'm
13 speaking of is the aspect of getting and inputting in a
14 line and I would just as soon go the route that looks the
15 best from the installation and the fact that we do have
16 to get into these places after the line is built into
17 the compressor stations and so forth and there is always
18 the possibility of trouble on a line. The accessibility
19 is a very important factor.

20 DR. HUGHES: I'm afraid I
21 diverted you ^{you were} in the course of explaining or putting an
22 assessment on the Klondike route. Maybe you'd like to
23 continue with that.

24 MR. KOSTEN: You're speaking
25 of the route from Dawson down to Whitehorse?

26 DR. HUGHES: Right.

1 MR. KOSTEN: It is from the
2 installation standpoint, a very favourable route.

3 MR. CHAIRMAN: Could I return
4 to the question that Dr. Hughes asked. I'm not sure which
5 Dr. Hughes is referring to. Whether he was referring to the
6 Carmacks/Faro section when he was asking the question about
7 side hills or whether he was asking about the Tintina
8 Trench as marked on the map.

9 DR. HUGHES: I believe the
10 assessment had been of something like one hundred miles
11 of side hill problem versus river bottom problem, northwest
12 from Ross River and I asked a question of whether that --
13 how the difficulty compared with the considerable length
14 of side hill along Marsh, Teslin Lakes, Swift River,
15 Rancheria River that is implicit in either the Alaska
16 Highway or the Klondike Highway route.

17 MR. CHAIRMAN: Yes, however,
18 in the north now we're talking about two different routes.
19 Both with difficult side hills, I understand if you jog
20 down to Carmacks or go down the trench. Your reply was with
21 regard to the trench itself, as I understand it, was it?

22 MR. KOSTEN: It was with
23 regard to both routes in that area. The difference being
24 that you do have a highway from Carmack over but there is
25 not room in the valley where you are going west from
26 Carmacks. Your area is too tight to contemplate putting a

1 pipeline in in the vicinity of the highway so you'd have
2 the same problem of going up on the side hills.

3 MR. CHAIRMAN: I don't know
4 whether this is a fair question or not but, I'm not a
5 pipeline engineer, but the length aside, which route offers
6 you more difficulty, the Klondike route or the Alaska
7 Highway route?

8 MR. KOSTEN: The relative
9 installation problems probably are almost equal in those
10 two alternates going from Whitehorse, either north or
11 from Whitehorse over to Beaver Creek and the Alaska border
12 along the Alaska Highway. You do have the situation of
13 additional mileage. The area from the border over to
14 Dawson, while it is a little longer, as an example of the
15 differences we've classified the first one hundred and
16 ten miles I believe it is, of the Alaska Highway route as
17 winter construction. I don't think that would be the case
18 on the--I guess it's referred to as the sixty mile route
19 or the top of the world route, from the border over to
20 Dawson I believe would be all summer construction.

21 MR. CHAIRMAN: Since that's
22 on weathered bedrock, would ordinary construction techniques
23 be used or would you have to do a lot of blasting, do
24 you think.

25 MR. KOSTEN: Well, you'd have
26 some raw blasting on that route, on both routes for that

1 matter but they are both -- one is conventional winter
2 construction which, this is a common term to us, what we
3 refer to as winter construction is swamp. Areas in the
4 Alaska Highway route which you don't encounter on the
5 route from the border into Dawson and that would be
6 conventional summer construction but you would have some
7 earth moving, rock ditching, and rock grade work on that
8 route.

9 MR. CHAIRMAN: Would crossing
10 of the Yukon River offer any special difficulty?

11 MR. KOSTEN: Well, it's a
12 pretty formidable crossing, there's no question of that.
13 We need more information to determine that. I think that
14 from the route that we have shown we would consider a
15 relocation of that, possibly going across the islands, even,
16 over to the islands which is just south of Dawson and making
17 two crossings out of it rather than one. Without having
18 more information on that we must admit that we are a little
19 deficient in information in that area.

20 MR. CHAIRMAN: And ^{with} reference
21 to the last intervenor, would you have to go up the
22 Klondike River and destroy the heritage of the dredge
23 piles?

24 MR. KOSTEN: I would give
25 a personal, rather than a corporate opinion on that.
26 Possibly the impact of a pipeline right of way in my ex-

Mr. Kosten
Mr. Trevor
Mr. Lazerte

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1 perience in other parts of the country, and I'm referring
2 more to Alberta and B.C. and Saskatchewan that if you don't
3 know where to look for it you can't find it.

4 MR. CHAIRMAN: Mr. Trevor
5 has a question.

6 MR. TREVOR: You've just
7 indicated that you feel there would be less winter con-
8 struction on the Klondike Highway route. Could we possibly
9 get an opinion on the permafrost question and the chilled--
10 how much of the line would be chilled as a comparison between
11 the Klondike route and the Alaska Highway Route?

12 MR. KOSTEN: I think I'd
13 like to defer that question to our manager of engineering
14 who's probably in a better position although the area
15 from the Alaska border to Dawson in my personal opinion,
16 I'd be very surprised if we had to chill that because of
17 the type of soil conditions that you'd have and the nature
18 of, in terms of elevation, the type of terrain that we
19 have. I could be wrong on that, I stand corrected if I
20 am.

21 MR. LAZERTE: I'd have to
22 say that at the moment we are running chilled into Dawson
23 but the, as Mr. Kosten has indicated, the studies aren't
24 there to justify it. At the moment that is the design
25 for the costing and what have you.

26 MR. CHAIRMAN: Could you

1 give reasons why you would choose that as a preliminary
2 decision in that terrain?

3 MR. LAZERTE: I guess from
4 a timing constraint, I would assess it this way, that the
5 design on the American side was for all chilled stations
6 and I think, in the time we had, we just simply took what
7 we had and went with that. It's not a very technical
8 approach so far.

9 MR. CHAIRMAN: Fine. Are you aware of the
10 routing on the American side? Does it go down to Tok or does it go pretty
11 well west? Or is it at all laid out?

12 MR. KOSTEN: The present
13 configuration of the routing of the Alaskan side, we have
14 been involved in it only from the standpoint of looking at
15 where we might connect up but the present tendency is that
16 they will follow the Alaska Highway to Tetlin Junction
17 and then come up the Taylor Highway.

18 MR. CHAIRMAN: Thank you.

19 MR. KOSTEN: I must say that
20 this is really a decision of Alcan Pipeline and this seems
21 to be their attitude at the moment, now it possibly could
22 be subject to change. We do have discussions with them
23 and they seem to feel that, the attitude there seems to be
24 to stick with the existing corridors in terms of the roads
25 in the highway.

26 MR. CHAIRMAN: I understand.
I suggest we have a coffee break. I see other people have

1 questions for you so we'll come back in a few minutes.

2 (PROCEEDINGS ADJOURNED)

3 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

4 MR. CHAIRMAN: Does anyone
5 have questions for Foothills on the construction aspects
6 and alternatives? Mr. Romaine?

7 MR. ROMAINE: We have a
8 number of questions and comments. I'm not sure how to
9 handle them so do you want questions first and then
10 statements later, or --

11 MR. CHAIRMAN: Questions,
12 I guess, first.

13 MR. OSWALD: When you
14 ititially expressed your preference for the Klondike route
15 you'd indicated a stretch of some fifty miles of wetland
16 that would require winter construction occuring at one
17 junction and I'm not sure which junction you're referring
18 to.

19 MR. KOSTEN: If you have a
20 look at the maps, it's in the McQuesten area.

21 MR. OSWALD: Is it unique
22 to the Klondike route as indicated on that map over there
23 on blue or is it common to all three of those routes coming
24 down that valley then?

25 MR. KOSTEN: I believe it's
26 common to all of them.

Mr. Oswald
Mr. Bouckhout
Mr. Romaine
Mr. Kosten

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1 MR. OSWALD: I see. Thank
2 you.

3 MR. BOUCKHOUT: I think the
4 common was that that would probably be the preferable mode
5 not that it was impossible to do summer construction there
6 but winter construction is probably a preferable mode.
7 We'd take a more detailed look at it to see if it was
8 absolutely necessary to do winter construction.

9 MR. OSWALD: I think my main
10 problem was this confusion. I thought the fifty miles that
11 he was talking about was unique to the Klondike and not
12 being common to the other three and this is what I wanted
13 clarification on.

14 MR. KOSTEN: No. I believe it's common
15 to all three of them. The comment, I guess is on the route that we have
16 looked at through
17 there. There is high ground in the area which you could
18 go through but from the standpoint of good pipeline location
19 and how you're going to get it done and what's going to
20 happen to it, the preference that we have selected at this
21 point is the valley and probably winter construction in
22 that area.

23 MR. ROMAINE: Do you wish our
24 comments now, Mr. Chairman?

25 MR. CHAIRMAN: Sure.

26 MR. ROMAINE: Mr. Emslie
will start off.

1 MR. EMSLIE: Thank you Mr.
2 Chairman. These comments have been mentioned before in
3 connection with the Alaska Highway route, but apply as well,
4 to alternate routes so I will be brief.

5 Topographic and meteorological
6 constraints must be considered when selecting sites for
7 compressor stations since these effect the magnitude of
8 the environmental effects of ice fog, emission concentration
9 and noise. In that regard I was glad to hear this afternoon
10 that caribou are not affected by compressor noise. They
11 seem to be by aircraft and vehicle motion, whether it's
12 the motion or the noise has yet to be decided.

13 Actually, the propagation
14 has not been documented in a scientific manner which in-
15 cludes the measurement of the meteorological parameters
16 that control the intensity of the noise. I refer to
17 temperature, wind, humidity, inversion intensity, and
18 there I reference the consultant's document on transmission.
19 These must be recorded in any assessment of the effects
20 of sound on ungulates and including caribou if the data
21 are to have meaning.

22 A rating of the alternate
23 routes from the compressor station point of view is largely
24 dependent on the selection of sites. That is, it appears
25 that there are good sites and bad sites on each alternate
26 route. Mr. Wahl, with his extensive knowledge of these

1 topographical and meteorological conditions in the Yukon
2 can give a rating of the routes based only on these
3 constraints.

4 MR. WAHL: The only comment
5 that I would like to make particularly is that, okay, as
6 mentioned, we're more concerned than anything else with
7 the compressor sites, potential ice fog and noise factor
8 and this is a constraint that will develop under conditions
9 of low temperatures and light winds and normally will
10 always occur only in the rather, or be more severe in the
11 valleys, lower valley floors and the further removed they
12 are from the Pacific coast.

13 In that respect the Tintina
14 route would not be as acceptable as the Klondike route,
15 particularly the valley of the Pelly is subject to ex-
16 tremely low temperatures as is the area in around Kasawa(?)
17 and Francis Lake. The one concern that I have particularly
18 with just listening to some of the possibilities in around
19 Dawson City, I think, as I stated earlier that if a
20 compressor site were based in the valley with Whitehorse,
21 we would be very concerned from both the aircraft movement
22 and vehicular and similarly in the valley at Dawson City.
23 Dawson City is subject to rather prolonged severe cold
24 spells and if a compressor site were in the valley floor
25 in the vicinity of Dawson it could cause considerable
26 hardships

MR. KLASSEN: My question doesn't have, specifically to do with construction although it relates to it. I'd like to address the question to Mr. Bouckhout if I may. Some of the problems that we encountered along the Alaska Highway route, resulting from differences of opinion as to the impact on wildlife along

1 the route may have resulted from the fact that environmental
2 studies were not instituted as soon as they might have been
3 and I'm wondering whether, since your construction people
4 are already looking at a route in the Klondike area, whether
5 you have environmental consultants looking at the ramifi-
6 cations of that route?

7 MR. BOUCKHOUT: Yes, in fact,
8 we already have the team of consultants who initially
9 appraised the route in terms of the Boundary Road area,
10 the Klondike area and the Dempster are sitting behind me
11 and haven't had much of a chance to say anything. Pretty
12 high priced.

13 MR. KLASSEN: We'll be happy
14 to hear them.

15 MR. BOUCKHOUT: I was kind of
16 hoping you'd say that. We've already completed a one
17 week reconnaissance of the entire area. The utilizing
18 helicopters and stopping at various locations. The personnel
19 involved in that included Mr. McClaren(?) from Beak
20 Consultants, who's a fisheries biologist. Mr. Owens, who
21 is an ornithologist, Ron McLaughlin, a mammalogist, and
22 Dr. Wartnou, who again, the four biological consultants
23 essentially. The week prior to that the geotechnical crew had
24 also evaluated the route in the same manner, from a
25 drainage/terrain point of view.

26 As a result of those initial

1 overview reconnaissance studies, the various people now are
2 charged with developing programs and suggestions and
3 recommendations for the kinds of studies we should be
4 doing.

5 The studies I anticipate,
6 particularly on the Boundary Road and Klondike area will
7 begin within about two weeks.

8 MR. KLASSEN: These studies
9 are directed just with the Klondike route then as a result
10 of the favorable assessment from a technical point of view.
11 Or will environmental studies be conducted along the other
12 possible alternates as well?

13 MR. BOUCKHOUT: Our current
14 plans are to place our emphasis for the initial field work
15 on the Boundary Road Klondike and follow that very closely
16 with coordinated studies with your group on the Dempster.

17 MR. KLASSEN: Good. Thank
18 you.

19 MR. CHAIRMAN: Mr. Hernandez?

20 MR. HERNANDEZ: No questions.

21 MR. CHAIRMAN: Panel staff?

22 Dr. Schilder?

23 DR. SCHILDER: Mr. Chairman

24 I have a question for Mr. Kosten from Foothills. How
25 would you confer the expected ground water problems along
26 the Alaska Highway and the Klondike routes?

Mr. Kosten
Mr. Claridge
Dr. Schilder

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1 MR. KOSTEN: I guess we'd
2 have to really let our geotechnical people give you an
3 assessment on that. If I might introduce Mr. Claridge
4 from Klominot(?)

5 MR. CLARIDGE: As Mr.
6 Bouckhout indicated, Dr. Schilder, we haven't had much of
7 an opportunity to examine the Klondike route so all I can
8 offer you is a quick opinion and I can't back it up. My
9 view is that on the Klondike, in general, ground water
10 interruption would be less of a problem than along the
11 Alaska Highway route, notably in the northern one hundred
12 miles of the Alaska Highway route where considerable cross-
13 drainage is passed by the pipeline and I don't see quite
14 the same extent of a problem on the Klondike.

15 One other consideration that
16 has possibly an effect here on the Klondike, the question
17 of the location of a chilling cut-off was raised before the
18 coffee break. The soils in general in the northern part
19 of the Klondike route appear to be predominantly free of
20 excess ice and I feel that there is a potential for a
21 completely warm line in the northern part of the route and
22 if this were so, then, the magnitude of ground water
23 interruption, I feel, would be very slight.

24 DR. SCHILDER: Thank you
25 Mr. Chairman.

26 MR. CHAIRMAN: Mr. Lister?

1 MR. LISTER: Mr. Kosten
2 mentioned that he was considering a ninety foot right of way
3 at one stage in his commentary on the various alternatives.
4 I was wondering if that was an acceptable right of way, or
5 whether that was just in certain locations where something
6 narrower than one hundred and twenty feet was required?

7 MR. KOSTEN: Well, our
8 proposal for the Alaska Highway routing was for a ninety
9 foot right of way which, if I recall correctly, I'm going
10 on memory here, was for a permanent sixty foot right of
11 way and an additional thirty foot working space and the
12 same, am I correct in that? No? I'm sorry, I stand
13 corrected. It was for a total of one hundred and twenty
14 foot. Generally speaking, there will be places where you
15 need more than ninety feet but if you have access you can
16 get by it. We probably, I believe, in our plans, looked
17 at clearing, generally, ninety feet with an extension to
18 one hundred and twenty feet in some instances.

19 MR. BOUCKHOUT: I think I
20 previously
21 addressed that question/and as Mr. Kosten has now mentioned,
22 we have applied for one hundred and twenty foot right of
23 way, but in previous response to that question, as I've
24 indicated, in normal circumstances we will not clear any
25 more than we require. We feel that ninety feet, generally,
26 will be the cleared width, however, we would like the
facility to go extended width in certain conditions where

1 we feel it's necessary for adequate construction.

2 MR. KOSTEN: I might add to
3 that that the approaches to the river crossings would involve
4 considerably more than the one hundred and twenty feet even.
5 You're looking at probably something of the order of two
6 hundred feet for a limited distance from the water's edge
7 of each side of the river crossing.

8 MR. LISTER: Thank you.

9 MR. CHAIRMAN: Any questions
10 from the floor? Dr. Lacate has a question.

11 DR. LACATE: I'm just trying
12 to get straight in my own mind a question to Foothills on
13 what we've heard discussed over the last half hour or so.
14 You mentioned summer construction on the sixty mile stretch
15 and, as I recall, most of the rest of that blue line,
16 except for that forty mile winter construction, is all summer
17 construction. So what does this mean in terms of your
18 logistics? Is this going to change size of camps, numbers
19 of camps, locations of camps, when you're faced with a
20 major summer construction period and a rather small winter
21 construction compared to the Alcan route. Is this a major --

22 MR. KOSTEN: Is the question
23 in relation to the area west of Whitehorse. I'm not sure
24 I understand your question in terms of change.

25 DR. LACATE: I'm trying to
26 get a feel for how different your logistics would be on the

1 Klondike route versus the Alcan route since you have a very
2 small winter construction period on the Klondike route.

3 MR. KOSTEN: Well, our basic
4 plan for the Alcan route was for seven sections starting at
5 the Alaska border. There were three spreads slated for
6 winter construction from the border down to one hundred
7 and ten miles. The balance of it was slated for summer
8 construction as well. The reason, basically being that it
9 is in the north and is fairly swampy and there's some
10 permafrost in there. What we had on the Alcan route was
11 three summer sections -- I'm sorry, three winter sections
12 starting in 1979, we had, if my memory serves me correctly,
13 we had two summer spreads, when I say spreads these are
14 construction crews, starting in the summer of 1979 and
15 then two winter sections which would move back up into the
16 one hundred and ten mile area which is divided into three
17 sections. The following summer we had three sections and
18 then one section in the winter of 1980 and we were completed
19 by approximately April of 1981, I'm sorry, giving us that
20 last summer that if we ran into unforeseen problems that
21 we would have that final summer in which to complete any
22 uncompleted sections at that point.

23 I would foresee that for the
24 Klondike route, we would have one more section of about
25 a hundred miles which would be a summer section. Now,
26 it knocks out the winter section in that sense because we

1 would only have, if our assessment is correct, of the
2 forty or fifty mile section, that could be completed in one
3 winter season. The balance of it, we feel, would be all
4 summer construction.

5 DR. LACATE: So therefore,
6 you might have larger crews?

7 MR. KOSTEN: No sir.

8 DR. LACATE: You wouldn't?

9 MR. KOSTEN: No. The crews
10 are geared for a forty eight inch pipeline, whether the
11 routing is up the Alcan or the Klondike. The size of the
12 crews are the same. We're looking at two spreads per
13 season.

14 MR. CHAIRMAN: Considering
15 that you have access all the way, what are your constraints
16 on actual construction. Could it all be constructed in one
17 year. What are the limitations?

18 MR. KOSTEN: Well, you'll
19 have to consider the fact that we're not just building a
20 five hundred mile pipeline from the Alaska border to the
21 bottom of the Yukon border here. In addition to the work
22 that we would have going on you would be looking at, I
23 believe, it's something of the order of four hundred
24 and fifty miles in B.C. for West Coast transmission. You're
25 looking at the cross Alberta section for Alberta Gas
26 Trunk Line. You're also looking at the Saskatchewan portion

1 and take it down to the U.S. border in Monchy and from the
2 Crow's Nest area down to King's Gate in southern B.C. in
3 southeastern B.C. Our assessment at this point in time
4 is that you would peak out at^a total of nine spreads that
5 would have to be working simulataneously during the summer
6 of 1980 which is a peak and probably the same in the summer
7 of 1981 so we can't consider this project in isolation
8 insofar as the Canadian portion is concerned.

9 MR. CHAIRMAN: So that is
10 governed by the number of skilled people and the amount of
11 pipe you can deliver I suppose.

12 MR. KOSTEN: That is correct.
13 These are all factors that we have taken into consideration.
14 The availability of pipe, when it has to start being
15 manufactured, which involves lead times and so forth from
16 the standpoint of pipe availability because the mills
17 can't produce them as fast as we can lay them. And we
18 actually have to start manufacturing the pipe six to
19 twelve months ahead of when we actually need it on site.

20 MR. CHAIRMAN: Mr. Trevor?

21 MR. TREVOR: Following up on
22 that argument, then, and looking at the Klondike routing
23 which would probably end up with eight spreads instead of
24 seven because of the extra mileage, and considering the
25 availability of the machinery in relation to the rest of
26 the pipeline, it appears to me that if you did all the

1 construction in the summertime on the Klondike route that
2 could be done in the summertime , you would add one year to
3 your schedule?

4 MR. KOSTEN: I'm sorry, I
5 didn't hear the last comment sir.

6 MR. TREVOR: Well, just
7 concentrate on the Klondike route, assuming it might be
8 eight spreads instead of seven. Seven of those eight
9 could be done in the summertime. You would only need to
10 do one in the wintertime.

11 MR. KOSTEN: Well, our
12 schedule is based on spreading the construction over about
13 a two and a half year period rather than trying to do
14 everything in one summer season.

15 MR. TREVOR: Yeah, I
16 appreciate that. The point I'm making is that if you
17 deliberately set out to do as much of the Klondike route
18 in the summertime as possible then you would indeed
19 overrun your present schedule because there wouldn't be
20 the spread machinery available to handle it.

21 MR. KOSTEN: Maybe I haven't
22 expressed myself properly here. We're looking at a two
23 spread operation over about a two and a half year period.
24 In other words, on the Yukon section we would have two
25 spreads operating over a two year period both winter and
26 summer. Maybe I'm misinterpreting the question.

1 MR. TREVOR: Yes, well, I was
2 using that information to go on to the Klondike where you
3 could have one winter spread and seven summer spreads which
4 would mean, at the rate of two spreads a year, three and
5 a half years instead of two and a half years.

6 MR. BOUCKHOUT: Well, the
7 changeover for one thing, from the Alaska Highway, if, in
8 fact, there were to be a changeover, and we're certainly
9 not saying there is, would be that three spreads, which are
10 needed to construct the one hundred and ten miles of
11 winter would only take one spread to construct that in the
12 summer. So you'd dropped two spreads effectively.

13 MR. TREVOR: Thank you.

14 MR. BOUCKHOUT: Due to
15 the difference in productivity.

16 MR. CHAIRMAN: Another
17 question to do with availability of manpower and pipe.
18 Assuming approvals were given, when would be the earliest
19 you could start on the Dempster?

20 MR. KOSTEN: Our current
21 thinking on that is that we would be looking at a --
22 assuming a 1981 completion of either the Alaska Highway
23 or the Klondike route, the target dates that have been
24 looked at there is November 1, 1981 delivery. And in
25 relation to that the Dempster would go onstream in 1984.
26 So you've got about a two and a half year period to three

1 year period and our current thinking on that is a three
2 spread operation over that period of time.

3 MR. CHAIRMAN: So you could
4 possibly start construction in 1982. Is that right?

5 MR. KOSTEN: That is correct.

6 MR. CHAIRMAN: Any more
7 questions on construction aspects? One other question.
8 Are you considering any other alternatives in the
9 southern Yukon than the Klondike or the Alaska Highway
10 route?

11 MR. BOUCKHOUT: No the basic
12 route as filed is the Alaska Highway route. We're con-
13 sidering the alternative of the Boundary Road/Klondike
14 connection as Mr. Kosten's already mentioned. We have
15 considered the Tintina combinations as possibilities but
16 we're considering nothing else than that.

17 MR. KOSTEN: I might add there
18 that, internally at least, the concensus is that we've
19 dropped any further consideration of the Tintina Trench
20 route or any possibility of that which is not a final
21 decision necessarily. If it was required that this be
22 pursued then we'd consider that in the future. At the moment
23 we are not.

24 MR. CHAIRMAN: Thank you.
25 Now, do we have any comments on the meteorological sub-
26 mission that was presented by Mr. Emslie and Mr. Wahl?

Mr. Lazerte
Mr. Wahl
Mr. Emslie
Mr. Bouckhout

1 Yes?

2 MR. LAZERTE: By way of
3 repetition but I just wanted to make our position clear
4 again that we are going to look at the phenomenon of ice
5 fogging and at the moment we don't believe it to be a
6 problem.

7 MR. CHAIRMAN: Yes.

8 MR. WAHL: Mr. Emslie has
9 a further part of his statement to make.

10 MR. CHAIRMAN: Mr. Emslie?

11 MR. EMSLIE: A couple of
12 points. There is an adequate amount of climatological data
13 along the Alaska Highway to make construction and operat-
14 ional decisions. I think particularly in terms of winter
15 construction up there. Where there is a lack of this
16 climatological data on alternate routes, what meteorological
17 measurement programs are currently in operation or are
18 planned along these alternate routes by Foothills Pipeline
19 Company and it's consultants?

20 MR. CHAIRMAN: Would you like
21 to --

22 MR. BOUCKHOUT: Sorry about
23 that.

24 MR. CHAIRMAN: Would you
25 like to comment on the question.

26 MR. EMSLIE: I'll repeat the

1 question, I think they were chatting.

2 MR. CHAIRMAN: Okay, fine.

3 MR. EMSLIE: Where there's
4 a lack of a climatolgocal data on alternate routes, what
5 meteorological measurement programs are currently in
6 operation or are planned along these alternate routes by
7 Foothills Pipeline Company and consultants?

8 MR. BOUCKHOUT: To my know-
9 ledge, we have none underway currently and I'm not aware
10 of any particular plans to institute meteorological stations.
11 I know that the meteorological conditions and particularly
12 with respect to terrain and so on, are considered in the
13 design and citing of compressor stations which is the
14 primary implication but I'm not aware of any particular
15 meteorological work that is planned. Perhaps Mr. Lazerte
16 might have a comment on that.

17 MR. LAZERTE: No I would
18 respond the same way. I would just mention as an aside,
19 that we do have a number of ground temperature measurement
20 spots on location up and down the present routing and
21 we regularly and seasonally read those thermistor strings.

22 MR. EMSLIE: Thank you.

23 Next point, the AS of Department of Fisheries and Environ-
24 ment will honour it's mandate to provide base line data
25 from areas of Yukon not now so covered. The timing of
26 these installations and their number will depend upon the

1 FE budgetary constraints but the Yukon has a priority.
2 The measurement of those meteorological parameters are
3 required for site specific decisions on the location, con-
4 struction and operation of the pipeline are the responsibility
5 of the company but the AS will assist wherever possible on
6 advice on instrumentation, network location and design,
7 et cetera.

8 The question, after start up
9 does the company plan to install remote reading
10 meteorological instrumentation at each of it's compressor
11 stations as is the norm for new major industries in Canada
12 which have environmental implications.

13 MR. LAZERTE: We'll be
14 monitoring at the compressor stations, the kind of basic
15 data that you are suggesting and, of course, that will be
16 coming in with the stream of other processed data and,
17 well, period.

18 MR. EMSLIE: I might mention
19 that, we particularly valuable for Mr. Wahl in advising you
20 on flight possibilities into compressor sites for
21 maintenance and this sort of thing.

22 MR. LAZERTE: I'm just
23 afraid we're going to have to mention again. You said
24 flight, did you not?

25 MR. EMSLIE: Flight or
26 travel, whatever.

1 MR. LAZERTE: Well, I just
2 would like to put that one to rest again, other than road
3 access we don't plan any flights into compressor stations.

4 MR. EMSLIE: Fine.

5 MR. CHAIRMAN: Any more comments
6 on any of today's proceedings? Mr. Bouckhout?

7 MR. BOUCKHOUT: I just have
8 one brief tie in comment with respect to Mr. Kosten's
9 discussion on construction and the discussion on environ-
10 mental implications and that is it's my opinion that in
11 general this also relates to selection of routes, that the
12 faster and the easier construction would be, the easier
13 it's going to be to mitigate environmental impact. I
14 think this is a principle that can be applied, in general.
15 There are obviously going to be exceptions to that principle
16 but when one considers it as an overall rule, I think it
17 does definitely have applicability.

18 MR. CHAIRMAN: Thank you.
19 If there's nothing further, tomorrow when we start at
20 one o'clock, I would suggest that we clear up some tag
21 ends. Mr. Templeton, or his colleague will be here to
22 answer questions on the timing paper that he presented to
23 us and also, I think, there's one piece of data yet to
24 come from Envirocon and then we will ask our advisors to
25 tell us what we should have learned, what we can learn
26 from the experience, the evaluation of the routes in the

1 Mackenzie Valley. So until tomorrow at one.

2 (PROCEEDINGS ADJOURNED)

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Vol. 11

Environmental Assessment Review

Panel July 13, 1977

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ENVIRONMENTAL ASSESSMENT REVIEW PANEL

IN THE MATTER OF AN APPLICATION BY FOOTHILLS PIPE LINES (YUKON) LTD. TO THE MINISTER OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT FOR A GRANT OF THOSE INTERESTS IN THOSE AREAS OF TERRITORIAL LANDS IN THE YUKON TERRITORY AS MAY BE NECESSARY FOR THE CONSTRUCTION AND OPERATION OF THE SAID NATURAL GAS PIPELINE AND THE WORKS AND FACILITIES CONNECTED THEREWITH AND INCIDENTAL THERETO,

AND

IN THE MATTER OF A PANEL TO REVIEW THE ENVIRONMENTAL ISSUES RELATED TO THE PROPOSED ALASKA HIGHWAY GAS PIPELINE.

THE CHAIRMAN: DR. H. M. HILL

MEMBERS: DR. O. HUGHES
MR. L. CHAMBERS
MR. B. J. TREVOR
MR. C. WYKES
DR. D. LACATE

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VOLUME 12

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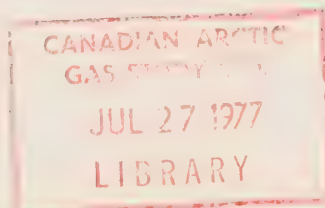
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THE CHAIRMAN: Are we ready
to convene?

Before I introduce the subject
for today, and go through the procedures, I'd like to clean up
two items which we can first thing. The first topic is some
further information by the Envirocon Group, on the comparative
analysis within the Yukon.

Mr. Parkinson, would you
like to address that now, and then we will have a brief dis-
cussion on the Templeton group schedule. When it was brought
up before, the author of the schedule was not here, Mr. Dogle.
He is now here and Foothills would like to make some comment,
so first, Mr. Parkinson?

MR. PARKINSON: Thank you,
Mr. Chairman. I have just prepared a short closing statement
to the presentation we made the other day, and I think the
simplest way is just for me to read this into the record,
and then answer any questions that might arise from it.

This is with respect to the
alternatives that we were asked to compare. Our tentative
comparison of environmental feasibilities of alternate

1 pipeline corridors in the Yukon Territory was presented to
2 the hearing on Tuesday, and opened to discussion. Many per-
3 ceptive comments and searching questions arose during the dis-
4 cussion that followed, which focused on the data base, the
5 basic assumptions, the methodology, and the validity of the
6 results.

7 It became apparent, as dis-
8 cussion progressed, that the Tantina trench alternative might
9 achieve more favourable ratings if a corridor from Carmacks
10 along Little Salmon Lake to Ross River was considered,
11 rather than passing straight down the trench from Stewart
12 Crossing past the MacArthur Game Reserve. The team of special-
13 ists undertook to make this comparison and report its findings
14 back to the panel. This has now been done, and we are
15 pleased to report the results of this work.

16 The rankings reported Tuesday
17 remain unchanged, although there is less of a spread in the
18 total component's corners. This might have been expected
19 since the most significant component, wildlife, is reduced
20 while due to avoidance -- is reduced somewhat, due to avoid-
21 ance of the virgin territory in the Tantina trench, in favour
22 of the highway corridor past Little Salmon Lake. Any reduct-
23 ion was offset in part, due to the additional mileage that
24 would be introduced, so that while there was a net improvement
25 in the rating, it was not sufficient to alter the original
26 alternatives ranking order of Klondike, 1, Alaska Highway, 2,

1 the Tantina-Robert Campbell alternative, 3, and the Tantina-
2 Liard, 4.

3 We remain convinced that this
4 comparative ranking of preference, based on environmental
5 indicators for a pipeline corridor in the Yukon is valid.
6 We hope it will serve as a useful aid in reaching decisions
7 with respect to pipelines in the Yukon, and our report will
8 be presented to the panel before the end of July, and that
9 will describe the methodology, in some detail, and we'll
10 provide the reader with the opportunity to follow through
11 the comparison step by step.

12 Thank you.

13 MR. CHAIRMAN: Thank you, Mr.
14 Parkinson. Are there any questions from the panel?

15 Any questions from other
16 advisors on this latest input? From panel staff? From
17 the floor?

18 Thank you very much then,
19 Mr. Parkinson.

20 MR. PARKINSON: Thank you.

21 MR. CHAIRMAN: The next sub-
22 ject we would like to come back to is the timing schedule
23 as presented the other day. Mr. Doyle is with us, and
24 possibly one of the questions that was asked is what is
25 the critical path for this process? The diagram presented
26 was a bar chart, and possibly Mr. Doyle could quickly go

1 through that and then I'll open up questions.

2 MR. DOYLE: Dr. Hill, members
3 of the panel, the purpose of this chart was to indicate
4 initially, what some of the probable scheduling implications
5 would be of this project. Basically what was done was to
6 take the Foothills application for a 48 inch line, and trans-
7 scribe that onto the chart and their activities, 10 through
8 15.

9 Working backwards from those
10 activities, we estimated activities 3 through 9 as being
11 activities that Foothills would go through, in getting the
12 organization together, and the financing, et cetera, and
13 we indicated that there's considerable amount of slack in
14 those activities.

15 Flowing from the Energy Board
16 report, there are a number of requirements dealing with the
17 Dawson diversion and the Dempster application, and they are
18 merely indicated as Items 1 and 2, under the company
19 activities.

20 Moving to the regulatory
21 activities section of the chart, a number of requirements
22 have -- and commitments have been indicated. The Energy
23 Board has asked for the Dawson diversion studies, and no
24 doubt there would be Energy Board activity as a result of
25 Foothills submitting that, that's shown as activity 16.

26 The terms of reference of

1 this hearing and of the Lysyk hearings, indicated that
2 either a formal air process would follow a decision to take
3 the southern Yukon corridor, or else a, or a full socio-
4 economic impact assessment would be undertaken. Those two
5 activities are shown as activities 18 and 20.

6 We have estimated that process
7 to take a year, of course it may be shorter, but for the
8 purposes of putting together a schedule, we have used the
9 one year estimate.

10 Items 22 through 27, indicate
11 the sequencing of activities that would be required to
12 establish an agency, namely the formation of it, the orient-
13 ation for the people involved, finalizing their stipulations
14 and procedures which would be then transmitted to the
15 pipeline company, who would in turn submit their detailed
16 plans in compliance with those stipulations for review by
17 the agency, and also the preconstruction review would be
18 undertaken, and then field inspection would occur and
19 commence at the same time as pipeline field activities.
20 Not mainline installation, but field activities.

21 In order for the stipulations
22 to be prepared and for the socio-economic impact assessment
23 to be completed, it's apparent that there are a number of
24 activities that will be required, namely activities 28
25 through 31, dealing with the development of socio-economic
26 controls.

1 Much has been said about
2 various problem areas, and different people perceive pro-
3 blems differently, so we have indicated here, certain phases
4 to the development of socio-economic controls, namely
5 defining the problems, devising solutions, integrating of
6 all those solutions, because one solution may pull against
7 another one, and finally developing an implementation
8 mechanism for administering those solutions or controls.
9 And it would seem to me that that should be complete, prior
10 to the finalization of the socio-economic impact assessment.

11 Now, the critical path, to
12 use the term a little loosely and apply it to a bar chart,
13 as I see it, would commence with activities 28 through 31.
14 It seems that a nine month period to get the very difficult
15 area of socio-economic controls all ironed out and agreed
16 to by the many parties that will be involved, the various
17 levels of governments, communities, interest groups, various
18 sectors in the economy, native groups, et cetera, it would
19 be quite a complex matter of negotiation and so it would
20 seem that this nine month period, between the commencement
21 of activity 28 and the conclusion of activity 31, will be
22 fairly tight.

23 So the critical path would
24 follow through those, would then move to the end of activity
25 number 18, which is the socio-economic impact assessment
26 and hearings associated with that. When that would be

1 completed, I envisage that the output of that hearing would
2 go to the Energy Board in considering the Dawson diversion
3 studies that would, by that time, have been completed.
4 The Energy Board would make its ruling, and then the agency
5 would be in the position to finalize all its stipulations
6 to be transmitted to the pipeline company, and then one could
7 move into, depending on the scheduling of Foothills, into
8 either further N.E.B. detailed approval and agency review
9 and approval phase.

10 At the end of September in
11 year 4, the critical path moves up to the Foothills con-
12 struction schedule, basically activity number 12, final
13 engineering, then into right-of-way preparation, actual
14 construction, testing, commissioning and ultimately operation.

15 So the point here is that
16 during the first three and a half years, as indicated on
17 this chart, it seems the critical activities lie with the
18 regulatory functions. There are many different groups
19 involved, the Energy Board, Indian Affairs, the Territorial
20 Government, and many others, and all these have expectations
21 with regard to input into the control phase and the regulat-
22 ion of the project, and then it's only at that point,
23 towards the end of Year 4, as indicated on this schedule,
24 that the pipeline company really gets onto the critical
25 path for their activities.

26 In preparing this schedule,

1 we were mindful that it's not the last word on scheduling.
2 If one were to get the various parties involved in develop-
3 ing the regulatory activities together, I am quite confident
4 that a tighter schedule could be worked out.

5 However, at this time, I am
6 unaware of any evidence led to any of these Inquiries, that
7 has given a clear indication of just how this whole thing
8 will be put together, and I think it's a very critical
9 matter, because the pipeline company, as soon as it gets
10 formal approval, will want to proceed with all due haste.

11 However, the regulatory
12 activities, it would seem from this initial look at
13 scheduling, will have considerable difficulty in meeting
14 the expectations, I believe of Mr. Blair, in talking about
15 being in operation in 1982. This chart would indicate being
16 in operation in 1984.

17 Thus, the point that I would
18 make is that there is considerable emphasis and stress
19 should be placed by this Inquiry, into the development of a
20 co-ordinated schedule by the regulatory agencies and by
21 government, so that a schedule could be worked out by
22 government, and that that schedule could then be related
23 or relayed to the pipeline company, who in turn, would
24 respond and come up with an agreed-to schedule, so that
25 everyone is working with the same project schedule.

26 Now, that basically summarizes

1 the argument and point of this chart. There are some
2 implications, that as you shorten -- if we look at the bottom
3 of the chart, we have a number general sort of phases;
4 planning and approval, organization, preconstruction and
5 construction. There are implications, as you endeavour to
6 shorten the schedule, in the planning phase, if you shorten
7 the schedule, you reduce the time available to those in-
8 volved in Indian Native claims to achieve an agreement in
9 principle, prior to the actual route decision.

10 You also compress the time
11 available for the development of socio-economic controls
12 and for a formal E.A.R.P. process and socio-economic
13 impact assessment.

14 In the second major phase,
15 the organization, there is more room there for schedule
16 compression, but again, the various parties involved would
17 have to work that out between themselves and the implicat-
18 ion would be that, less time would be available to the
19 Native claim negotiators in arriving at a final agreement,
20 and achieving some implementation of that agreement, prior
21 to the actual installation of the pipe.

22 That summarizes what I would
23 like to say on this.

24 MR. CHAIRMAN: Thank you very
25 much. Any questions from the panel?

26 What would the situation be

1 if the government gave a route approval in September?

2 MR. DOYLE: Basically, the
3 approvals that we've shown here would be a corridor approval
4 in September. My reading of the National Energy Board
5 Report is that they have indicated a preference for the
6 Dawson diversion, but I am not sure that they are firm on
7 that matter until they have seen the designs and evidence
8 that will be brought forward by Foothills and others on
9 that matter.

10 MR. CHAIRMAN: You didn't
11 answer my question.

12 MR. DOYLE: Well, if the route
13 approval were given in September, then that really wouldn't
14 change what regulatory activities would have to occur.
15 There is still the commitment to go through the formal
16 E.A.R.P. process and the impact assessment activities, and
17 develop the socio-economic controls, so no matter what
18 approval is given in September, these commitments still
19 stand.

20 MR. CHAIRMAN: Thank you.
21 Any questions from our advisors?

22 Mr. Bouckhout?

23 MR. BOUCKHOUT: I feel
24 obliged to say something. I must say, to begin with, I am
25 rather comforted to hear Mr. Doyle indicate that the sche-
26 dule could be compressed.

1 We feel that it definitely
2 can be compressed a considerable extent. I think Mr. Doyle
3 has already indicated that the critical path, almost in its
4 entirety, lies through the regulatory activities portion.
5 I certainly personally cannot speak to government regulatory
6 activities, but I personally have more faith in that kind of
7 a system, than obviously Mr. Doyle has, the extent of time
8 he feels will be required.

9 From the company's activities
10 point of view, I feel that the chart has really been
11 sensitive, obviously to the regulatory activities portion.
12 From our perspective, obviously, the company activities'
13 bars can be constricted to a considerable extent.

14 I think it's partially due
15 to the mutual exclusivity of some of the activities shown
16 in the top portion of the chart. The portions, as Mr.
17 Doyle has already described, from numbers 10 through 15,
18 in general agree with our sequencing of construction
19 activities. However, the preliminary work leading up to
20 that point, extending, in the case of this chart, some
21 three and a half years, we feel is much, much more than
22 what is required.

23 So in essence, we have, in
24 fact, prepared some written response to this particular
25 chart. The written response was particularly prepared for
26 the Lysyk Inquiry. If you so wish, Dr. Hill, I could

1 provide you with a copy of that written response.

2 MR. CHAIRMAN: Please do.

3 Any questions from panel
4 staff?

5 I have a question with regard
6 to an assumption you appear to make, that one control
7 agency would control some aspects of the project, while
8 another control agency would control other aspects of the
9 project.

10 The N.E.B. approvals apparently
11 don't come under the "one agency" concept?

12 MR. DOYLE: There has not been
13 any decision by anyone to indicate that the N.E.B. traditional
14 process in monitoring the construction of pipelines and
15 approving detailed plans, would indeed come under a single
16 agency, and thus I have not provided them within that
17 agency.

18 However, there has been con-
19 siderable discussion about the single agency to co-ordinate
20 the interests of many other government departments and
21 groups and Territorial interests in a pipeline project,
22 and it's in recognition of such an agency that I have
23 indicated it separately from the N.E.B. I think that's
24 a matter of decision by government, as to how the pipeline
25 control function will actually be co-ordinated and organized.

26 DR. HILL: Well, as you know,

1 there are already agencies set up to control development in
2 the north and in Canada, and I understood that one of the
3 basic premises of the one-agency concept is that there would
4 be one person actually in charge to make decisions when
5 different agencies' needs conflicted.

6 But this proposal to keep
7 N.E.B. out of that situation seems to defeat the purpose of
8 a single agency.

9 MR. DOYLE: Dr. Hill, this is
10 not a proposal to keep N.E.B. out or to include N.E.B. I
11 am not really addressing that, I am looking at what the
12 scheduling implications of various activities are.

13 If one were to redraw, one
14 could well redraw this chart, assuming the N.E.B. within
15 the single agency, and you would really just overlap two
16 activities.

17 MR. CHAIRMAN: This is really
18 what I'm getting at is that assuming that the existing
19 authorities, in fact regulate the construction of a pipeline,
20 the Minister in charge of the Territorial Lands Act, and the
21 Minister in charge of the Fisheries Act and so on, the
22 Minister of the Territorial Government responsibilities and
23 so on, would it make much difference in your scheduling?

24 Does the one agency cause a
25 lengthening of the time required before approval can be
26 given?

MR. DOYLE: Quite the contrary.

I would say that a one agency would facilitate the time required and compress it, because then everyone would be putting their input, their requirements with regard to the mandates under which they operate, and I would assume, delegating that to the, let's call it the head of the agency and authorized officer, and that then the process would be much more efficient because, in essence, the pipeline company would be confronted with basically one, people have referred to it as a "one window approach", they'd have one door to go to to get all their permits and everything else.

So that the process with a single agency may well be much more efficient, signals would be clear and communications would be a lot better.

MR. CHAIRMAN: Okay, thanks very much. Are there any other comments or questions?

Thanks very much then, Mr. Doyle.

We will now move on to our scheduled business for the day. Maybe a little bit of history is in order before I get down to the procedures.

When the panel was asked to carry out this review, and issue an interim report by August the 1st, it was evident, of course, that a great deal of thought and work had gone into appraisal of the Mackenzie Valley alternative. We felt that we should

1 utilize that knowledge as best as possible in our short
2 review.

3 We came to the conclusion the
4 best way of doing this would be to schedule the discussion
5 on the -- I hesitate to say "comparison", but on the differ-
6 ent aspects of the two routes in these hearings, with two
7 purposes. The first and important purpose is to utilize the
8 knowledge gained in the long hearings that took place on
9 the Mackenzie Valley alternative ; and the second purpose,
10 if possible, would be to compare them environmentally.

11 Of course, comparing them
12 environmentally is an onerous task, and we didn't expect
13 to get very far on that particular part, so our main object-
14 ive is to learn from the people that were involved in the
15 Mackenzie Valley hearings.

16 We have with us several people
17 today who haven't attended these hearings before, so I think
18 we should briefly run through the procedures we'll use today.

19 What I suggest is that the
20 people who are here to address us on this comparison, do so
21 in order. After each presentation, we will have questions
22 in the usual manner, and then we'll move onto the next
23 presentation.

24 So just to identify who is
25 here to address us, I have a list here and I will just --
26 I am not sure it's a correct list, so I'll create a new list

1 by running through it and asking if there is anyone else
2 wishes to address us.

3 We have Mr. Roed, he's here.
4 Would you mind taking a chair at the table, making out a name
5 tag so our transcriber knows who you are.

6 Don McKay. Jeff Stein.
7 Dalton Muir. Dennis Surrendi. Malcolm Dennington and Peter
8 Rennie. Malcolm Dennington isn't here.

9 Is there anyone else wishes to
10 address the panel on this comparative issue? Yes?

11 MR. CHAIRMAN: Excuse me,
12 would you mind speaking into the mike?

13 MR. ROED: We have also have
14 one of my staff engineers, Dell Hallett, will also be
15 accompanying me.

16 MR. CHAIRMAN: Fine. Yes?

17 MR. ROED: Yes, Dr. Don
18 Thomas is the fellow that should be named on my behalf
19 there.

20 MR. CHAIRMAN: Okay, thank
21 you.

22 Before we started our review,
23 we identified this need to have this advice, and the Depart-
24 ment of Indian and Northern Affairs organized the people
25 who could supply this advice, so these people are here
26 on their behalf. I guess they are here on their own behalf,

1 but they have been asked to come here through the auspices
2 of Indian and Northern Affairs.

3 Who would like to begin? No
4 volunteers? Peter Rennie?

5 MR. RENNIE: I have a map,
6 Mr. Chairman, that might assist in addition to your very
7 excellent one, if arrangements could be made to pin it up,
8 it will sure assist people in seeing where the Mackenzie
9 Valley is.

10 MR. CHAIRMAN: Would you do
11 that? Would people who haven't made out name tags, do so,
12 so that we can know who you all are?

13 MR. RENNIE: In addition,
14 Mr. Chairman, there is Mr. Lee Hardy here, who is a member
15 of the former group.

16 MR. CHAIRMAN: Thanks very
17 much.

18 MR. RENNIE: Mr. Chairman, I
19 have a fairly extensive brief, which has been prepared, but
20 this covers other aspects than those which we are concerned
21 with here today, and I am only going to present verbally
22 those sections which are more relevant to the issues under
23 consideration.

24 The brief has the title,
25 "A Broad Environmental Comparison of Northern Canadian
26 Natural Gas Pipeline Routes", and it has attached to it,

1 eleven specialists' appendices, which are really the contri-
2 butions which permitted the synoptic analysis of routes.

3 What the brief does, is to
4 aim to compare the relative merits of different pipeline
5 routes for moving Arctic natural gas to points in southern
6 Canada and beyond. Altogether in the study, 12 routes or
7 combinations of routes are included.

8 Now, a very important point
9 about the study and the brief, is that it's not directly
10 concerned, with whether or not there should be a pipeline.
11 It's not concerned with the relative merits of different
12 industry proposals. It's not designed to reach and develop
13 terms and conditions.

14 But what the report is, in
15 fact, is a broad synoptic analysis, based upon specialist
16 contributions in a number of areas, and these are:
17 Permafrost and engineering problems; vegetation and
18 vegetation relationships; hydrology; terrestrial mammals;
19 avi fauna; fish and marine mammals; conservation
20 areas and recreation lands; native use of resources and
21 environmental design.

22 There are three aims in the
23 brief: To identify the main environmental sensitivities
24 associated with each route, and indicate their approximate
25 level of significance. From this, to rank routes in order
26 of preference, based, as far as possible, on a quantitative

1 summation of the sensitivities which have been identified,
2 and then to stratify comparisons, so that you're comparing
3 routes that have similar gas transmission capabilities.

4 Now, I spoke earlier of 12
5 routes, and these are made up of three for the Arctic
6 Islands, which on the map, are shown on the west and the east
7 of Hudson's Bay. We won't be concerned any more with those
8 today.

9 There are four major western
10 Arctic routes, that to date have generated formal industry
11 proposals. These are the Trans Alaska; El Paso, running
12 from Prudhoe Bay, on the Beaufort Sea to Gravina Point near
13 Valdez in Prince William Sound on the Pacific.

14 The Alaska Highway, or the
15 Alcan, which utilizes parts of the Alaska/Canada highway
16 route. A point I have to clarify here is that this study
17 was concerned with the Alaska route proper, which is only
18 one of the three variants which this panel has been consider-
19 ing.

20 Then, there is the Foothills
21 route along the Mackenzie Valley proper, from Richards
22 Island in the delta, and lastly, the Canadian Arctic Gas
23 Pipe Line route, which is substantially the same in the
24 Mackenzie Valley, but also includes the Northern Yukon
25 section.

26 Of the remaining four western

1 Canadian Arctic routes, all are Canadian, and three are spur
2 or linking routes that will permit the Alcan, or the Alaska/
3 Canada highway route also to serve -- also to move Canadian
4 Western Arctic gas. They are, firstly Alcan, combined with
5 a spur route along the Dempster Highway; Alcan, combined
6 with a spur route along the Canol Road, and part of the
7 Mackenzie Valley proper; and the Alcan, combined with a
8 spur route across the Northern Yukon; and the fourth com-
9 bination is not so much a linking of routes, but almost a
10 parallel or dual Alaska Highway and Mackenzie Valley
11 development.

12 Now, the final route is a
13 linking route, or so-called Y connection route, which runs
14 from Richards Island, right across to Baker Lake. Again,
15 I'll say no more about that.

16 Now, I would like to say some-
17 thing now on what I would call the basic constraints and
18 framework conditions for the comparison, and some basic
19 assumptions. I think, first of all, it's usual to analyze
20 the environmental susceptibility, or acceptability, of a
21 specific industry proposal, only when at least a preliminary
22 environmental impact statement is available.

23 The validity of this procedure
24 stems from the recognition that environmental design is
25 critical. It's not only what is developed, but how it is
26 developed. The question that is repeatedly put in an analysis

1 is, how well do a proponents' proposed environmental safe-
2 guards adequately meet the demands of the situation?

3 This review of routes, there-
4 fore, is rather unusual. For some of the routes, environ-
5 mental sensitivities have not been identified and assembled,
6 and no specific impacting variables have been defined.
7 All that specialists have had, as a working basis, is the
8 assumption that the usual range of construction and operation
9 activities associated with pipeline development will occur.

10 Specialists may assume, also,
11 that there will be invoked, some regulatory terms and con-
12 ditions associated with the permit. These would be designed
13 to safeguard environmental features.

14 Now, as a working guide,
15 certain pipeline activities had to be assumed, and these
16 included, very briefly, the controlled and location surveys,
17 establishment of wharves, staging areas and stockpiles, the
18 building of facilities, air fields, helicopter pads, camps
19 and roads. Right-of-way clearing by special Arctic or
20 normal construction methods, the construction of snow and
21 ice roads, the use of water for camps and pipe testing,
22 the operation of sewage treatment units at camps, the haul-
23 age and delivery of heavy equipment; supplies and gravel;
24 the handling of large quantities of oils and lubricants;
25 the installation and welding of pipe; the construction
26 and installation of compressor stations at approximately 50

1 mile intervals; the pressure testing of pipelines; the
2 crossing of major rivers or inter-island crossings; the
3 clean-up, restoration and revegetation of disturbed areas;
4 the operation of noisy compressor stations; regular sur-
5 veillance flights along the right-of-way; the need to
6 conduct emergency repairs at any time of the year; the
7 increased chances of man-made vegetation fires; and last
8 but not least, the invasion of a work force of some 6,000
9 to 20,000 people during the construction phase.

10 Now, everyone of these
11 activities could be expanded into sub-activities; each of
12 considerable significance in its own right, and for one
13 recent formal proposal, for example, over 140 different
14 impacting activities were identified, and these were reviewed
15 in relation to a somewhat similar number of environmental
16 characteristics.

17 Now, no such detailed treat-
18 ment is possible in this short review. Specialists have
19 adopted a broad brush approach, by considering the main
20 sensitivities within their environmental field, in relation
21 to the above general range of impacting activities.

22 Now, I want to say something
23 on levels of environmental knowledge. Comparing the
24 environmental merits of different pipeline routes in central
25 and northern Canada, is both similar and dissimilar to the
26 more familiar problem of deciding where a new highway

This was focused in the general Mackenzie Valley area over the period 1971 to '75, and generated for this geographical area, a level and variety of environmental knowledge that probably exceeds that

1 available for any other northern area.

2 In contrast, for example, the
3 areas of the Hudson's Bay routes have been far less studied,
4 for here the comparable Arctic Islands pipeline program
5 of environmental studies commenced much more recently, and
6 is on a much smaller scale.

7 To some extent, the Alaska
8 Highway route is in a similar category, for it came to be
9 excluded as a possible transportation corridor area, when
10 this concept for grouping transmission and communication
11 systems was being developed in the early 1970's. In this
12 instance, though, the lesser developed level of knowledge
13 is to some extent, offset by the suspected fewer environmental
14 concerns along the route, and their less serious sensitivities.

15 Quite aside from the above
16 difficulties, there are those associated with the slowness
17 with which knowledge in some important environmental dis-
18 ciplines can be generated. It is often not just a question
19 of men and money, although these are essential, but of
20 slowly accumulating data over the seasons on such complex
21 biological and physical phenomena as the migratory paths
22 of caribou; the flooding levels of rivers; or the lateral
23 drainage patterns through the soil active layer.

24 Some inventory data can be
25 quickly accumulated, but others require years of patience
26 before their meaning can be advanced to the level that

1 something useful and reliable can be forecast in the context
2 of the possible impact of a pipeline activity. Environmental
3 scientists are understandably apprehensive, therefore, when
4 they are asked to provide a quick estimate on the merits of
5 routes, whose environmental attributes are very -- are really
6 very little understood.

7 Now, this is reflected, I
8 think, in the various specialists' reports which accompany
9 this brief, and in being asked to provide as clear an answer
10 as possible, many, I think, are apprehensive that there is
11 some misinterpretation of what they have actually said, or
12 that their remarks are made on the basis of quite definitive
13 experimental studies.

14 Now, in this brief, there are
15 several major assumptions which you could class as part of
16 the analytical methodology. The first one is that the
17 routes are being assessed solely in respect of a single
18 major gas pipeline and its ancillary facilities; not for
19 an oil pipeline, or for any wider combination purposes
20 which were described as a corridor.

21 The second point is that the
22 various pipeline development activities described earlier
23 would be included for the construction and operation phases.

24 The third assumption is that
25 the gas pipeline would be buried, and the gas chilled;
26 the chilling ceasing at some point within the discontinuous

1 permafrost zone.

2 The general possibility that
3 looping might occur in the future has been assumed, where
4 I think one would expect that the repetition of impacts
5 associated with such a development would make the less
6 preferable routes, less so.

7 There is, of course, the
8 assumption, as I've said before, that there would be some
9 regulatory terms and conditions, and there is the assumption
10 that a likelihood that the proportion of constraints would
11 prove inadequate, or they would be omitted, or that unfore-
12 seen accidents or inadequacies of one sort or another would
13 occur.

14 Now, the approach taken by
15 each disciplinary specialist, has been to take a few major
16 concerns that arise within his disciplinary field. For
17 example, in the terrain area, these include such aspects
18 as seismicity, northerliness, miles of permafrost, miles
19 of sensitive terrain, and loss of agriculture and forest
20 lands.

21 In the hydrologic field,
22 there are included such aspects as the number of major
23 river crossings, and the opportunities for scour on the
24 ocean bay. Now, this of course, does not apply, the ocean
25 bay aspect, to the routes we are considering.
26

1 For terrestrial mammals, there
2 is interference with traditional movements, loss of habitat,
3 harassment and disturbance and detrimental contacts.

4 For fish, river crossings are
5 again potential danger spots, with in addition, wharf and
6 dock construction, the use of water, the inadvertent intro-
7 duction of pollutants and the extent of gravel removal.

8 The conservation areas and
9 recreation lands, the linear mileage affected is a rough
10 criterion, while in the environmental design area, a type
11 of comprehensive yardstick is used, embracing such aspects
12 as potential for catastrophe, ability to follow scheduling
13 and the proximity of transportation facilities.

14 These concerns are elaborated
15 much more in appendices and my colleagues on this task, who
16 are mostly here today, could speak at greater length on
17 these aspects.

18 The next stage was for each
19 specialist to identify the number of such concerns along
20 each route, and provide, if possible, some simple estimate
21 of each concern's significance. For example, in the
22 avi faunal assessment, the concerns associated with the
23 various bird species are annotated, and a quantitative
24 estimate is then given of the severity of each concern
25 within a simple scale; high, medium and low.

26 Overall severity ratings

1 are then computed for each route that permits a ranking or
2 expressions of preference.

3 As might be expected, the
4 certainty with which the questions can be answered varies
5 according to the environmental concern being considered.
6 In some instances, there is no doubting which is the pre-
7 ferred route. In other instances, the preference is less
8 clear.

9 As also might be expected,
10 preferences for routes can vary according to the environmental
11 characteristic being considered. Those anxious to protect
12 Dahl sheep, do not like that sub-variant of the Northern
13 Yukon/Mackenzie Valley line, that runs just east of the
14 Richardson Mountains.

15 The only alternative, however,
16 that runs across Shallow Bay, is strongly disliked by
17 those anxious to protect Beluga whales. How are sheep and
18 whales to be compared and placed on a common scale?

19 Now, this touches on the
20 conceptually most difficult part of an overall analysis,
21 and one that could defy a straightforward quantitative
22 treatment. In effect, if the route preferences for all
23 environmental interests agree, then the overall environmental
24 preference is obvious. But if they do not agree, then
25 no simple hammering into shape may be possible or desirable.

26 In the case of disagreement,

1 the overall synthesis of environmental concerns may be far
2 more complex than a straightforward summation of concerns.
3 Thus, 9 out of 10 preferences may point one way; yet the
4 odd man out may be voicing a concern that far transcends
5 the other 9 in importance. A lack of concordance would
6 call for a much closer look at what the concerns are all
7 about, how important they are, to what extent they are
8 critical in a broader, geographical context, and how feasible
9 it might be to protect them.

10 In this analysis, therefore,
11 all individual specialists' preferences have been collated
12 in tabular form, so that the degree of agreement, and dis-
13 agreement, can be readily seen. From this initial tabulat-
14 ion, it may be seen that the degree of agreement is very
15 marked, and there is little difficulty at arriving at a
16 majority preference.

17 In expressing majority pre-
18 ferences, however, care has been taken to specify the areas
19 of disagreement.

20 I shall now say something on
21 the major environmental concerns associated with each route,
22 then the preferences for each route, within the framework
23 of a series of scenarios.

24 First of all, the four main
25 routes, for which there are far more industry proposals:
26 The Trans Alaska/El Paso route is preferred to the other

1 three because it involves no Canadian territory. However,
2 the merits of the route are not further elaborated in this
3 review, and no detailed environmental comparison with
4 Canadian routes has been developed. Essentially, El Paso
5 is the more preferred route for Canada, only if just Alaska
6 natural gas is to be transmitted.

7 If a linking to Canadian
8 reserves in the Mackenzie Delta-Beaufort Sea area is
9 required, then environmentally, the Alcan route is preferred
10 over El Paso and over the Northern Yukon/Mackenzie Valley
11 route.

12 The reason is that if El Paso
13 were favoured, the only possible Canadian linkage would be
14 across the northern Yukon to Prudhoe Bay, and probably
15 through Old Crow, by reason of the spur transportation corri-
16 dor in the Alaska system mentioned above, running south of
17 the Alaska Wildlife Refuge, adjacent to the Yukon border,
18 and not through it.

19 An El Paso development,
20 therefore, would not only make it very difficult for Canada
21 to participate in a joint transmission facility, but it
22 would offer Canada the most highly sensitive and least
23 desirable of environmental choices.

24 The Alcan route, on the other
25 hand, appears first to offer certain marketing and tech-
26 nological advantages to the United States. The gas is

1 brought directly into the mid-western States, and less is
2 lost by obviating the fuelling of a liquefaction process.

3 Secondly, it utilizes a route
4 along the Alaska Highway in the southern Yukon, and of
5 course, I must emphasize again that this study was done
6 before the other alternatives to the Alaska route appeared.
7 Secondly, it utilizes a route along the Alaska Highway in
8 the southern Yukon that demonstrates, that is demonstrated
9 in the tabulation that I referred to, does not give rise
10 to strong environmental concerns, and when I say "strong
11 environmental concerns", this is a term relative to the
12 comparison that is being made in this study.

13 Thirdly, the Alcan route
14 offers Canada feasible ways of participating in a common
15 international transmission facility. A linking pipeline
16 along the almost completed Dempster Highway is the most
17 favoured combination route, but particular care is needed
18 in interpreting the omnibus ratings shown in this report,
19 for reasons that are explained in Appendix 11.

20 Of the four main routes
21 included in this comparison, therefore, environmental pre-
22 ferences can be expressed, but their order depends upon the
23 background desiderata. If only Alaska gas is to be trans-
24 mitted, then the El Paso route is the first choice. If
25 only Canadian, Mackenzie Delta-Beaufort Sea gas, the Macken-
26 zie Valley route, but if both countries' western Arctic

1 reserves are to be moved, then Alcan with a spur line is
2 the first preference, and not the Arctic Gas route.

3 Turning now to the specific
4 environmental concerns associated with the three routes, and
5 I'll just call these CAGPL's, Foothills and Alcan's, and
6 by that I mean, the Northern Yukon and the Mackenzie Valley,
7 the Mackenzie Valley and the Alaska Highway, respectively.
8 The advantages of the last named in the southern Yukon are
9 most marked.

10 The Alcan route contains the
11 least mileage of sensitive terrain, and traverses very little
12 permafrost. It runs with the river systems, not across
13 them. Several decades' experience with the Alaska Highway
14 has provided considerable environmental understanding of
15 terrain and hydrological sensitivities along the route.
16 The presence of an existing highway means few new haulage
17 roads have to be built. Demands for gravel are less, there
18 is more snow, for snow and ice roads, and the need for the
19 latter is less.

20 As a consequence, there is
21 less scope for disturbance to terrestrial and aquatic
22 habitats, and the ability to adhere to construction sche-
23 dules is seen to be less difficult. Threats to wildlife
24 are not entirely absent, but the Alaska Highway is far
25 removed from the more northerly Yukon areas that are
26 heavily used by important migratory species.

The main difference between the CAGPL and Foothills' routes is the former's inclusion of a highly sensitive northern Yukon spur. This adds very greatly to environmental concerns, making the omnibus hazard rating at least two-thirds greater than for either of the other two routes.

1 On the Yukon coastal slope,
2 there are major hydrologic problems associated with ground
3 ice; the flashy nature of river flow and proneness to
4 aufeis. There are very serious concerns related to
5 caribou and Dahl sheep, and the same is true for a variety
6 of species of birds whichever of CAGPL's sub-variants of
7 the Northern Yukon-Mackenzie Delta route is examined.

8 All three sub-variants of this
9 route present aquatic hazards, perhaps the most serious of
10 which are the threats to fish and marine mammals in Shallow
11 Bay and the threat to salmon at Old Crow.

12 A pipeline with compressor
13 stations and regular surveillance helicopter flights in the
14 Northern Yukon, would represent the most incompatible of
15 invasions into a wilderness area, whilst the hostility of
16 its climate and its remoteness make it the most difficult
17 of environments in which to conduct emergency repairs
18 without, at the same time, causing harm to environmental
19 characteristics.

20 From this examination of con-
21 cerns, therefore, it may be concluded that they are fewest
22 and least severe for the Alcan route, and are most numerous
23 and severe for the CAGPL route.

24 Now I come to the point of
25 Alcan combinations. Environmental concerns for the four
26 possibilities, Alcan plus Foothills, Alcan plus a northern

1 Yukon link, Alcan plus a Dempster link, and Alcan plus a
2 Canol link, are shown in another table in the brief.

3 The majority preference is
4 very strong for selecting Alcan plus Dempster as first
5 choice ahead of the other three, but the majority preference
6 is for placing Alcan plus Canol second, Alcan plus Foothills
7 third, and Alcan plus a northern Yukon link fourth, are
8 less uniformly manifested.

9 As the concerns associated
10 with the Alcan route itself have been shown to be generally
11 of a more limited nature, and again I must emphasize this
12 is speaking in this broad context of routes comparison,
13 those for the various combination routes reflect very much
14 the differences that occur among the four linking possi-
15 bilities.

16 Although overall concerns are
17 least for the Alcan-Dempster combination, the inclusion of
18 the Dempster link means the addition of some sensitive
19 terrain in the Richardson and Ogilvie Mountains. On the
20 other hand, the experience of an existing highway along the
21 alignment would contribute to the avoidance of hydrological
22 and terrain problems.

23 There are not considered to
24 be major concerns in respect of birds and fish, provided
25 suitable precautions are taken, but there are serious con-
26 cerns associated with caribou and to a lesser degree, Dahl

1 sheep. Mitigating circumstances in this regard could be
2 reduced disturbance through the use of an existing highway
3 for transportation and surveillance, and the exercising of
4 some control over access to the areas immediately adjacent
5 to the highway.

6 The second choice, Alcan-Canol
7 combination, is less desirable because it is longer and
8 picks up some of the sensitivities associated with the Northern
9 parts of the Mackenzie Valley. There are also, certain
10 terrain problems; steep and unstable slopes, necessitated
11 by crossing the Mackenzie Mountains, and there are hydrologic
12 problems, potential groundwater and icings west of the
13 Franklin Mountains.

14 Bird and fish concerns are
15 not considered to be serious, but those for terrestrial
16 mammals are unknown. More wilderness areas are thought to
17 be affected than for the Alcan-Dempster and Alcan-Foothills
18 combinations, but less than for the Alcan-Northern Yukon.

19 The third preference, the
20 Alcan-Foothills combination really amounts to two very
21 long separate, but roughly parallel major pipelines. Were
22 it not to be seriously put forward by industry, one would
23 be inclined to dismiss it as not being very practical.
24 As is demonstrated in one of the tables, the separate
25 concerns of the Alcan and Foothills routes are compounded
26 to produce an appreciable level of concern in respect of

1 numerous environmental characteristics.

2 Now, if I could summarize
3 rather briefly, the rankings of routes according to different
4 gas transmission capabilities, first of all, we have the
5 scenario of moving Alaskan and Canadian western Arctic gas,
6 and the first preference is for an Alcan-Dempster route,
7 and among the contributing specialists, there would be almost
8 universal agreement.

9 The second choice is Alcan-
10 Canol, for which there is fairly good agreement. The third
11 is Alcan-Foothills, the fourth Alcan-North Yukon, and the
12 fifth, on which there is almost universal agreement, would
13 be the Arctic Gas route in the northern Yukon and Mackenzie
14 Valley.

15 Now, if only Alaskan gas is
16 to be moved, and we exclude the El Paso possibility, and we
17 are taking a route through Canada, the first preference is
18 for the Alaska Highway route, and the second preference is
19 for the Arctic Gas route.

20 If we were considering just
21 the movement of Canadian gas alone, and Alaskan gas was not
22 involved, then we would probably favour, for environmental
23 reasons, the Mackenzie Valley.

24 Overall, therefore, what
25 comes through most strongly from this analysis is the
26 general environmental dislike of the Northern Yukon and

1 Mackenzie Valley route, and the attractiveness of the Alaska
2 Highway route, whether the latter is restricted just to the
3 Alaska Highway, or whether it also includes the Dempster
4 Highway link.

5 Thank you, Mr. Chairman.

6 MR. CHAIRMAN: Thank you very
7 much. Your presentation puts our exercise into some perspect-
8 ive.

9 Questions from the panel?

10 Mr. Trevor?

11 MR. TREVOR: Mr. Rennie,
12 there's one combination that occurs to me that I think you
13 didn't address. Perhaps you would clarify this point for
14 me, the combination of El Paso for north slope gas, and
15 Mackenzie Valley for delta gas?

16 MR. RENNIE: No, I don't think
17 that was really considered, that combination.

18 MR. TREVOR: What would be
19 the basic reason for that, just the fact it doesn't achieve
20 any combination, or was it on the grounds you put El Paso
21 on one side anyway?

22 MR. RENNIE: Well, the study
23 was primarily -- we were primarily concerned with moving
24 Canadian gas.

25 MR. TREVOR: Yes, I understand,
26 but even following that premise, I detected -- in fact, it

1 was in your concluding remarks, you said if you were dealing
2 with delta gas only, then Mackenzie Valley would be the pre-
3 ferred route.

4 MR. RENNIE: Yes ,yes.

5 MR. TREVOR: And then you said
6 if you were dealing with north slope gas only, then El Paso
7 is the preferred route, so if you add those two together,
8 then it would appear that that is a combination that might
9 have been looked at?

10 MR. RENNIE: Yes, that's true,
11 although we certainly had the background framework constraint
12 that there was a desirability of a joint transmission
13 facility.

14 MR. CHAIRMAN: Mr. Chambers?

15 MR. CHAMBERS: Just following
16 up on Mr. Trevor's question, I think that's what I got,
17 that you were saying the preferred route for Canadian gas
18 only would be the Mackenzie Valley, is that correct?

19 MR. RENNIE: Yes, that
20 comes through.

21 MR. CHAMBERS: But then in
22 your summation of your preferred routes, you have Alcan-
23 Dempster route over the Alcan-Canol route, and I was wonder-
24 ing, I wasn't sure, was that based just on length or what?

25 MR. RENNIE: I think it's
26 really, if you are comparing the Alcan-Dempster with the

1 Alcan-Canol, it's based upon all the considerations, all
2 the environmental components together. It's a summation
3 effect, and I think there's only one environmental interest
4 which would really prefer the Alcan-Canol, and that the
5 concern centred on caribou, but most other people would
6 prefer the other, the Alcan-Dempster.

7 MR. CHAMBERS: If I heard
8 correctly when you were going through the Alcan-Canol
9 route, was some point on the absence of access.

10 MR. RENNIE: Yes, that would
11 be a factor, yes, because although I didn't touch on it,
12 I think there is felt to be considerably -- considerable
13 upgrading of the highway that exists would be necessary to
14 serve as a transportation function.

15 MR. CHAMBERS: Yes, there
16 would be considerable upgrading on the Northwest Territories
17 side, but in fact the access was there at one time, and
18 is, to some extent, still there. Is this not correct?

19 MR. RENNIE: Yes, I believe
20 so.

21 MR. CHAIRMAN: Any other
22 questions from the panel?

23 Possibly a better time to get
24 into this will be when we're talking about wildlife per se,
25 and please tell me if it is, but we are very interested
26 in the Porcupine caribou herd, and we are aware that a

1 pipeline along the Dempster Highway may influence that herd.

2 We're also aware that the
3 highway itself may influence that herd, and I would appreciate a rundown on the comparative influences between the
4 north -- well, the Old Crow link, I suppose you would call
5 it, and the Dempster link, because it would appear that the
6 overriding feature in your comparison that ruled out the
7 use of the northern Yukon link, that's a northern trans-
8 Yukon link, was some effects possibly on the caribou herd,
9 but possibly other effects in the Old Crow area.

11 MR. RENNIE: Yes, Mr. Chairman.
12 My task really in the overall study was to synthesize and to
13 put together the various specialist contributions. I don't
14 particularly wish to speak to say mammals and the other
15 specialized interests, but I could say just very generally
16 that the north Yukon link, that is regarded as the most
17 highly sensitive area, and in respect of caribou, for
18 example, the route would go through the calving ground,
19 and I may be corrected by the mammal expert, but I believe
20 that is a more sensitive area than actually crossing a
21 migratory route.

22 But we could possibly hear
23 from Dr. Thomas a little later on this.

24 MR. CHAIRMAN: Okay, we will
25 get on that subject later.

26 Does anyone have questions

1 for Dr. Rennie?

2 MR. DOYLE: Could I ask a
3 question?

4 MR. CHAIRMAN: Certainly.

5 MR. DOYLE: It appears to me
6 that the question raised by Mr. Trevor may have been
7 answered. You indicate that if you were moving western
8 Arctic gas only, that you would prefer the Foothills over
9 the Alcan and Dempster.

10 Now, the way Mr. Trevor
11 phrased the question was, moving Prudhoe Bay gas, you prefer
12 El Paso; moving Canadian gas, you prefer the valley.
13 Well, in doing that, you have compared the Foothills and
14 the Dempster as one of the options, so in essence, if you
15 just put the two together, then, do you not, in fact, come
16 out favouring the El Paso and the Valley line?

17 MR. RENNIE: Yes, I think you
18 do that.

19 MR. CHAIRMAN: Dr. Beanlands
20 has a question.

21 DR. BEANLANDS: Dr. Rennie,
22 I notice that you haven't included the Klondike Highway
23 route or variance thereof, was that because you were not
24 aware of those possibilities when the report was being
25 prepared?

26 MR. RENNIE: Yes, that's

1 so, that's so, it didn't exist at that time.

2 DR. BEANLANDS: And one other
3 question; you mentioned, quite rightly in your opening
4 remarks, that in some cases a single factor may in fact,
5 I believe you said transcend the importance of other factors.
6 You obviously, or the experts involved in this study
7 obviously didn't feel that the impact, the potential impact
8 on the Porcupine caribou herd, which has received considerable
9 attention, during all the pipeline related hearings, does
10 not transcend the importance of the other factors related,
11 perhaps to the Canol route?

12 MR. RENNIE: Well, I think
13 we would take it as transcending it, to the extent that
14 we would exclude the northern Yukon link.

15 DR. BEANLANDS: I was refer-
16 ring particularly to the Dempster lateral.

17 MR. RENNIE: The Dempster,
18 I think the feeling there was that there was already a
19 highway there, and that some sort of regulatory mechanism
20 in relation to access to the highway, would perhaps accommo-
21 date this.

22 DR. BEANLANDS: So, in effect,
23 you're painting advantages to having the highway there, as
24 opposed to a disadvantage?

25 MR. RENNIE: Well, there's
26 the advantage in the sense that there's a transportation

1 link, but there's a disadvantage in that you have got un-
2 limited access, as it stands at the moment, or as it will
3 stand when presumably the highway is completed.

4 DR. BEANLANDS: I realize
5 this is a hypothetical question, but it might perhaps help
6 to clarify for the panel, the relationship between the road,
7 the Dempster Road and the proposed pipeline. In your
8 opinion, would you say that the selection, or the prior-
9 ization of routes would have been somewhat different if the
10 Dempster Highway was not in place?

11 MR. RENNIE: I think it
12 could have made a difference, yes.

13 DR. BEANLANDS: Thank you,
14 Mr. Chairman.

15 MR. CHAIRMAN: Any other
16 questions from panel staff?

17 Mr. Lister?

18 MR. LISTER: Dr. Rennie, I
19 would like to pursue the question of the relative ranking
20 of routes when you consider transporting Canadian gas only,
21 and it follows from an earlier question by Mr. Chambers.

22 I just wondered, what were
23 the principal factors which led you to prefer the Mackenzie
24 Valley over the Dempster-Alcan combination?

25 MR. RENNIE: Well, it would
26 be based upon the rankings that various specialists have

1 given, and I think that's just the way it comes out. You
2 get one, two, three and four, and you add them up that way.

3 But to be a little bit more
4 detailed on that, I think there would be a feeling that
5 there are serious concerns in the Mackenzie Valley, but
6 they could be accommodated with regulatory terms and con-
7 ditions. It's foreseeable that you would have no major
8 disasters, but for the North Yukon slope, people do not
9 feel anything like as confident in that part of the route.

10 Now, of course, the decision
11 that has been taken elsewhere for the Mackenzie Valley has
12 been largely based upon social concerns and social issues.

13 MR. LISTER: I could see some
14 attractiveness from the standpoint of distance simply, in
15 that it's probably rather, or undoubtedly theoretical anyway
16 at this stage, but I just wondered if you could enlarge a
17 bit on the factors, and I'm satisfied.

18 Thank you.

19 MR. CHAIRMAN: More questions
20 from panel staff? Any questions or comments from the floor?

21 Mr. Dennis Surrendi?

22 MR. SURRENDI: Mr. Rennie,
23 yesterday we were informed that if a pipeline was built
24 along the Dempster Highway, it probably could not follow
25 the highway per se, that is because of the configuration
26 of the highway; and secondly, as I understand it, and

1 perhaps I could be corrected, a separate road would have to
2 be constructed along the pipeline right-of-way.

3 Should the presence of the
4 Dempster Highway then prejudice the choice of that particular
5 pipeline route, or could the routing be re-examined outside
6 of the Dempster corridor, or the Dempster route as presently
7 designated?

8 What I am saying is that
9 there is a roadway which is referred to as the Dempster
10 Highway, which has focused the attention of your evaluation
11 on that particular spur option. The indications we have
12 from discussions recently here in this forum, were that the
13 Dempster Highway wasn't the only roadway that would be
14 there, there would be another one; and secondly, they
15 probably wouldn't follow the road per se anyway.

16 So what I am asking is that,
17 do you think this information would lend itself to an
18 examination of other alternatives, perhaps outside of the
19 Porcupine caribou range and southeast of the existing
20 Dempster Highway?

21 MR. RENNIE: Well, I was pre-
22 sent yesterday, and I found the discussion very interesting,
23 and I thought back to the situation in Alaska with the
24 so-called work pad, which is the area on which the pipeline
25 is constructed, and there is alongside, put 'alongside' in
26 quotes, a haul road, or I think south of the Yukon River, a

1 highway.

2 Now, in many places, that
3 haul road is quite a distance from the alignment of the pipe
4 or the so-called work pad, and the real transportation route
5 is either the highway in the southerly part, or the haul
6 road in the more northerly part, and there are enumerable
7 service road links, fly roads of one sort or another, and
8 of course, when the haul road was constructed, it was
9 constructed essentially as a service road to build the
10 pipeline, but it does not actually follow the pipeline
11 alignment necessarily that closely.

12 I think, and I was consider-
13 ing this yesterday in the light of what was being said,
14 and I think that when one comes to the actual plotting of
15 the alignment, say on the Dempster, one would really have
16 to look at it in much ^{more} detail to see how near and how far it
17 is. If it's going to be 20 miles away, then you begin to
18 wonder what the significance of the Dempster Highway is.

19 On the other hand, if it's
20 within a mile, then that is a much more significant factor,
21 along the lines of what I was previously saying, that is
22 to say, access and of course, convenience.

23 So I do agree with you that
24 a much closer look would be necessary to see how closely
25 the two alignments would follow.

26 MR. SURRENDI: Thank you.

1 MR. CHAIRMAN: Would you like
2 to make a point of clarification, Mr. Bouckhout?

3 MR. BOUCKHOUT: Yes, Dr. Hill,
4 perhaps more for Mr. Surrendi's benefit, since Mr. Surrendi
5 has just done an admirable job of explaining the situation.

6 With respect to the necessity
7 for roads, this would be partially dependent on the construct-
8 ion season, and it would also be partially dependent on the
9 localized terrain conditions, particularly whether, in fact,
10 it was ice rich permafrost or not.

11 It is not our intent to con-
12 struct and maintain a permanent road along the pipeline
13 right-of-way. This would be the case, irrespective of
14 whether the pipeline were to be constructed necessarily in
15 summer or winter, however, if it were to be constructed in
16 summer in a relatively ice rich terrain, then some kind of
17 a pad would be necessary.

18 If it were to be constructed
19 in summer in thaw stable terrain, then the requirements
20 for any kind of a pad would diminish considerably.

21 With respect to proximity to
22 the Dempster Highway, we were discussing this yesterday,
23 particularly in reference to the Eagle Plain area; what
24 we in fact said was that we felt it was not feasible to
25 parallel the Dempster Highway within a distance separation
26 of, for instance, a hundred yards. In other words, to

MR. BOUCKHOUT: That's a distinct possibility, Mr. Trevor, and it's particularly related to operations and maintenance, as well as just

1 construction, in that if heavy equipment is at all required
2 during operations and maintenance on that route, anywhere
3 along it, and there were no local accessibility; in other
4 words, your nearest road were to be 30 or 40 or 50 miles
5 away, you still must get your equipment there. And depend-
6 ing on the kind of equipment one might require, it would be
7 very difficult, in some instances, to utilize, for instance
8 a helicopter to get adequate equipment in, certainly not in
9 all instances, but an instance could arise whereby you
10 required heavy equipment which could not be airlifted, you
11 would have to go with ground access, and with ground access
12 then, you would have to make your way in.

13 Depending on the kind of
14 terrain, and the time of the year that that access was
15 required, it could have some significant ramifications.

16 MR. TREVOR: So there is
17 indeed a very basic difference in philosophy between both
18 Foothills and Arctic Gas on this question?

19 MR. BOUCKHOUT: Yes sir,
20 there certainly was, or is.

21 MR. CHAIRMAN: I think I'm
22 about to ask an unfair question, but I'll ask it anyway,
23 and possibly you or some of your group could answer it.

24 In looking at the southern
25 Yukon route, the proposal by Foothills (Yukon) Limited, it
26 became clear early on, that we pretty well had to open up

I think that the principles

1 of an environmental assessment are that one considers the
2 various options and tries to optimize and select the most
3 favoured environmental route.

4 There are other factors, of
5 course, social, fiscal and so forth, but if you haven't
6 taken those elementary steps, you really haven't done your
7 homework thoroughly from an environmental point of view.

8 MR. CHAIRMAN: Thank you, but
9 in your evaluation, the only one that you looked at all was
10 the Canol Road possibility, is that correct?

11 MR. RENNIE: Of the linking
12 ones, the Canol Road, the Northern Yukon spur, of
13 course, there are three sub-variants there. The Dempster
14 and yes, I think so -- not the southern Yukon variants at
15 all.

16 MR. CHAIRMAN: Thank you.

17 Mr. Bouckhout?

18 MR. BOUCKHOUT: Just a couple
19 of brief questions. The first with respect to El Paso,
20 what consideration did you give to El Paso? Did you rate
21 it high, simply because the El Paso system crossed no
22 Canadian Territory, or did you consider the implications
23 of liquefaction plants, regasification plants, LNG tankers,
24 et cetera?

25

26

1 MR. RENNIE: The El Paso is
2 ranked first because it crosses no Canadian territory, and
3 it's almost a hypothetical first choice. We do recognize
4 that it does pose a problem by increasing the amount of
5 tanker traffic on the west coast.

6 We do not foresee that a
7 tanker of liquid gas is a threat in itself, but we do fore-
8 see that an increase in tanker traffic, when you have
9 already got oil tankers moving into Prince William Sound,
10 is a very serious factor, because tankers are, by nature,
11 very unmanoeuvrable types of ships, and ^{there is} the recognition
12 that in saying it crosses the, the El Paso crosses no
13 Canadian territory, that if such a selection were made,
14 there is a very pronounced increase in environmental risk,
15 in a completely different area. That's in the estuary and
16 river areas of the West Coast.

17 MR. BOUCKHOUT: A second
18 question then is in relationship to the comparison within
19 Canada. Although I realize you did not consider the alter-
20 native of the Boundary Road and Klondike Highway, per se,
21 you did rate the combination of Alcan plus Dempster, which
22 would automatically implicate Klondike Highway as being a
23 preferred route.

24 If one were to go Boundary
25 Road, Klondike and the southern portion of Alcan plus
26 Dempster, that would be an alternative system which the

1 N.E.B. envisages as a possibility; then the comparison on
2 environmental grounds really becomes Boundary Road, as
3 opposed to that section of the current Alcan, from Beaver
4 Creek to Whitehorse.

5 Would you suggest then that
6 that alternative would also probably be rated as most
7 advantageous?

8 MR. RENNIE: Well, I wouldn't
9 like to comment, Mr. Chairman, on the three southern Yukon
10 possibilities, but some of my colleagues who are more
11 familiar with particular environmental issues on those
12 routes might care to amplify.

13 MR. CHAIRMAN: Any volunteers?
14 I think we have one question
15 from Dr. Beanlands.

16 DR. BEANLANDS: I would like
17 to make a point, perhaps it's only a point in principle,
18 but if Prudhoe Bay gas was to be moved via the El Paso
19 route, and my understanding is that your preferred route
20 for Mackenzie gas would be down the valley, is that right?

21 MR. RENNIE: That's right.

22 DR. BEANLANDS: Then, would
23 you agree that the implication is that the movement of
24 American gas through Canada would entail a higher degree of
25 environmental risk to Canadians,^{to}/Canadian terrain because
26 you prefer the Mackenzie Valley route to the Dempster-

1 Klondike and on down through?

2 MR. RENNIE: That's very
3 difficult to answer, because we did not consider in detail,
4 the extent of the tanker hazard, so --

5 DR. BEANLANDS: No, I'm refer-
6 ring to the impact to Canadian -- on the Canadian side.
7 Obviously, if Mackenzie Delta gas was to be -- was only to
8 be moved, you would go the Mackenzie Valley route?

9 MR. RENNIE: Yes.

10 DR. BEANLANDS: Now, that
11 implies that going down the Dempster and the Klondike to
12 connect up with the Alcan route would entail a higher
13 degree of environmental risk.

14 MR. RENNIE: Yes.

15 DR. BEANLANDS: So that by
16 running American gas through the Alcan route, there's a
17 higher degree of environmental risk to the Canadian terrain?

18 MR. RENNIE: Yes.

19 DR. BEANLANDS: Thank you,
20 Mr. Chairman.

21 MR. CHAIRMAN: Before I call
22 a coffee break, could members of your team that were here,
23 would you suggest the order in which we hear them, Dr.
24 Rennie?

25 MR. RENNIE: Would you like
26 that information now, Mr. Chairman, or --

1 MR. CHAIRMAN: After coffee
2 will be fine.

3 MR. RENNIE: Yes, sure.

4
5 (PROCEEDINGS ADJOURNED)

6
7 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

8
9 MR. CHAIRMAN: The Rennie
10 team will appear in the following order: McKay, Muir,
11 Thomas, Stein and Harding.

12 May we have your words, Mr.
13 McKay?

14 MR. MCKAY: Well, I was asked
15 to prepare a generalized evaluation and comparison of major
16 hydrologic concerns revealed in the assessments of the
17 Mackenzie Valley and Yukon Pipe Line proposals.

18 Now, it should be stressed at
19 the outset that it is selective, and it reflects a personal
20 judgment, based on the hydrologic concerns that have been
21 recognized in the various assessments. It is also weighted
22 by my experience in the north, which is mainly in the
23 Mackenzie Valley and delta region, and it suffers from my
24 lack of field experience in the Yukon.

25 The major sources drawn on
26 for this report are the Mackenzie Valley Pipe Line

1 assessment by the pipeline application group and the D.F.E.
2 brief, which was entitled "Preliminary Review of Environmental
3 Concerns Associated with the Foothills Pipe Line Proposal
4 and Selected Alternative Pipe Line Corridors".

5 Now, initially, I have listed
6 major hydrologic concerns, and I am going to amplify those
7 which particularly affect stretches of the pipeline route.
8 I don't know whether I should run down these concerns, I
9 guess I could. Do you want that?

10 MR. CHAIRMAN: Yes.

11 MR. MCKAY: Under river
12 crossings, I have listed: Sediment movement; dispersal
13 of toxic substances; channel constriction; icings,
14 aufeis, in other words; bit scour; lateral channel
15 migration; plankton stability.

16 Under terrain, we have
17 ground icing; surface flow vectering; ponding; thermo-
18 karst.

19 Under groundwater I have
20 disruption of groundwater flow, under quick conditions,
21 frost heaves, slope instability -- and of course, frost
22 heave could apply to river crossings as well.

23 I have also listed the more
24 obvious hydrologic processes or events affecting these
25 concerns, and these are snow melt runoff; summer storms;
26 outburst floods from glacier dammed lakes; freeze-up and

1 break-up; ice shove; ice jamming; cutbank erosion;
2 mass wasting solifluction; melting of ground ice and
3 sedimentation.

4 Now, how such processes or
5 events are translated into hydrologic concerns will be
6 indicated, as I discuss the various stretches or
7 sections covering the various parts of the pipeline routes.

8 I started with the Yukon
9 coastal plain, and this section of the proposed route cuts
10 across the hydrologic grain for some 130 miles, and a pro-
11 posal emphasizes winter construction and snow work pads and
12 snow roads.

13 Now, these roads will be
14 compacted by traffic to densities close to that of ice,
15 and they may form a semi-permanent feature lasting late into
16 summer and perhaps into the following year.

17 melt water could be
18 Now, vectored or pooled on
19 the high side of the road, causing permafrost degradation,
20 or on the down slope side, we could have melt over a
21 sustained period, which could cause sloughing and possibly
22 slope failure. We've seen this demonstrated through a
23 study we did on the semi-permanent snow beds in the slopes
24 and foothills of the Richardson Mountains.

24 There, we had this kind of a
25 condition with slope failure on the down slope side.

26 Another still related concern

1 is the problem of, I think, for winter construction anyway,
2 of mixing the snow with the spoil and increasing the ice
3 content during backfill operations.

4 Now, this snow/soil mix may
5 allow water movement, I think within the ditch. You don't
6 get the same density or compaction, I don't think, and it
7 could well result in excess spoil along the right-of-way.

8 The Richardson and the
9 British Mountains are occasionally subject to snow melt
10 run-off and to summer storms that produce extreme flow con-
11 ditions. Now, these large flows in the high gradient gravel
12 bed rivers of the Yukon Coast, usually lead to lateral
13 erosion of banks rather than to bed scour. This
14 is because the bed is imbricated and with the gravel
15 sort of overlapping each other, and this causes the flow to
16 sort of deviate, cross the bed and cut into the banks.

17 So that really the bank
18 stability problem is probably more a concern than scour.

19 Icings could be, I guess,
20 caused by the pipeline chilling, and this may rechannel
21 the flow, and it could exacerbate the bank stability
22 problem I guess, on some of those rivers.

23 Now, frost heaving could well
24 be the major concern, if it bends the pipe to a point of
25 rupture or exposes it to breakage by cobbles or boulders
26 moving down the high energy streams of the Yukon Coast.

1 I don't think of sedimentation
2 as being a major hydrologic concern in the Yukon. It may,
3 however, be viewed somewhat differently by Fisheries per-
4 sonnel. Sedimentation to me, at least in the Mackenzie
5 systems, is sort of a natural phenomena, and from mass
6 wasting and cutbank erosion and ice shove, you get tremendous
7 inputs of sediment into the river that I think dwarf, by
8 comparison, anything that man can put in there.

9 I then looked at the Mackenzie
10 Delta crossing, and this is a 52 mile stretch near the outer
11 delta perimeter, and this would not appear to be difficult
12 from any break-up or ice jamming point of view, because of
13 its proximity to sea level. It's an area where you do get
14 a lot of storms surging, however, and you could have some
15 problems there, I guess, when you go up onto the Islands.

16 The major concern again is
17 frost heaving of the pipe, particularly in the shoal areas
18 of the 12 or so miles of water, I guess that you have to
19 cross.

20 The outer delta is composed
21 of fine-grained sediments, and is probably more subject to
22 -- the modern delta, that is, the west side is more subject
23 to ice segregation than the older glacial lacustrine
24 portion as indicated by Richards Island.

25 I then turned to the Mackenzie
26 Valley section, and this section, as I conceive it, includes

1 the optional west side delta route, in a stretch from the
2 Swimming Point crossing, south to the Alberta border. The
3 west side delta option, as I see it, has concerns very
4 similar to the Yukon coastal plain. With the addition of
5 two major river crossings, where ice shove and ice jamming
6 may cause bank erosion and bed scour, the formation of
7 major ice jams on the Peel and on the Mackenzie near
8 Point Separation are possible, and they could conceivably
9 cause sufficient bed scour to move the underlying support
10 from the pipe.

11 We know there are scour holes
12 in the delta itself that are more than a hundred feet deep,
13 and it's very conceivable that you could have hydraulic
14 action that would cause scour holes that might reduce the
15 support for the pipeline.

16 If you follow the cross-delta
17 option, then the Mackenzie Valley right-of-way traverses
18 some 250 miles of continuous permafrost, that's south from
19 the Swimming Point crossing to the Fort Good Hope area,
20 and another 550 miles of discontinuous permafrost to the
21 Alberta border.

22 In the continuous permafrost
23 zone, the major hydrologic concern is due to chilling of the
24 gas, and crossing the streambeds, or the tallic zones in
25 the flood plains of the rivers.

26 Frost heaving of the pipe,

1 and/or icings may result. In the discontinuous permafrost
2 zone, the groundwater or flow systems can be interrupted or
3 changed by either cold or warm pipeline. A chilled pipeline
4 creates frost bulb which could block flow and cause ponding
5 of water on the up-slope side of the pipe, while as discussed
6 earlier, frost heave could cause undulations to develop in
7 the pipe and possibly break it.

8 The stretch of pipeline along
9 the west bank of the Norman Range of the Franklin Mountains,
10 may be the most critical from the groundwater point of view.
11 This is a karst area, and it has perennial springs and
12 icings and the blockage of flow by frost bulb development,
13 might accentuate icing problems and alter near-surface
14 groundwater flow systems.

15 I understand that chilling of
16 the pipeline will end about 160 miles north of Simpson.
17 Now, there is evidence of massive ground icing along the
18 Mackenzie as far south as Fort Simpson, and thus, melting
19 out of some ice bodies and high ice content soils along the
20 route by a warm pipeline, could lead to subsidence requiring
21 some remedial measure.

22 Wharves on the Mackenzie
23 are a relatively minor concern in one way, but their siting
24 could be important if the flow in the deep water channel
25 is affected, and generally speaking, I imagine you site a
26 wharf on a cut bank in the deep water channel, because this

1 kind of interference with the harmonics of the deep water
2 channel could be translated into a progression of changes
3 down the river.

4 There are two crossings in the
5 southern half of the Mackenzie Valley that are relatively
6 important, I guess, the Great Bear and the Southern Mackenzie
7 crossing above the Liard Junction, but both of these, from
8 my point of view, are relatively complacent ones, with
9 respect to bed scour, but they could have some problem with
10 bank stability. They're really in backwater areas from the
11 ice jamming that almost inevitably occurs at Bare rock,
12 and in the lower portion of the Liard.

13 Now, I then looked at the
14 Alaska Highway route, and the major river and stream cross-
15 ing concerns seem to relate to drainage disruption and the
16 consequent risk to pipeline replacement from extreme events,
17 such as unusual snow melt runoff conditions, or summer
18 storms or these yukawa or outburst floods from glacier
19 dam lakes.

20 My feeling is that the crossing
21 sites on the high energy rivers appear to be where the
22 gradients are flattening out, and where deposition in the
23 braided reaches is more significant than scour. Under these
24 conditions, an extreme flow event is more likely to cause
25 lateral erosion, and degrading bank conditions, rather than
26 deep scour in the bed.

1 I think you dissipate the
2 energy too fast to really cause much depth in bed scour.

3 The groundwater problems in
4 the chilled and unchilled portions of the pipeline right-of-
5 way are similar to those associated with the Mackenzie
6 Valley discontinuous permafrost zone. And again, in the
7 chilled portion, frost bulb development may block or con-
8 strain downwater flow with the associated icing problems,
9 ponding of water and frost heaving.

10 The unchilled or warm pipeline
11 section, melting of ground ice in the islands of permafrost
12 there are present^{and}/can cause subsidence in the ditch and
13 through the adjacent area.

14 I then looked at the Dempster
15 Highway. I know very little about this particular route,
16 but I would say the hydrologic concerns are those that are
17 generally permafrost related, and that is the groundwater
18 flow system disruption; development of icings; flow
19 vectoring and so on. And again, I would think the most
20 serious concern would seem to be frost heave and the attend-
21 ant problem of pipeline integrity.

22 With respect to the Klondike
23 Highway, I feel there are no major hydrologic problems.
24 There are minor ones, I guess, with possibly bank and bed
25 stability of some of the river crossings.

26 I just went up there and it

1 appeared to me that the only ice rich material that you get
2 is in the valley bottom, and I think, looking at the road
3 itself, that it looks as though it was built with scrapers
4 and there's no ice apparent in the ditching along the road,
5 and I know in roads that are built in Siberia, that I've
6 seen, that have been built by the same process, that you often
7 see peri-glacial indications along the sides of the road,
8 you will see ice wedging or something to that effect, a
9 little bit of subsidence that will outline the plattental
10 patterns that are part and parcel of very cold environments.

11 I know almost nil about the
12 Tintina Trench, and I would guess, just offhand, that you
13 might be in the valley bottoms a little more if you went
14 down that route, than you are in the Klondike, and therefore
15 I think there would be more ice rich material than you
16 would on the Klondike side.

17 Now, the numbers and distance
18 factors favour the Alaska Highway route over the Mackenzie
19 route, but I don't think there's much of a question there.
20 The distance across permafrost terrain and a number of
21 river crossings, the use and type of roads for both con-
22 struction and for contingency planning, the additional risk
23 of wharve sites on the Mackenzie, all point to the Alaska
24 route as the best route from a hydrologic point of view.

25 I understand that the Alaska
26 route may be out, but I thought that the 30 years of

1 maintenance work there, coping with hydrologic problems
2 along the highway, particularly at bridge and culvert sites,
3 was a big factor in favour of it.

4 Highway access, I think is
5 a very significant access -- asset where contingency plan-
6 ning must deal with unknown probabilities of extreme
7 hydrologic events. Hydrology is essentially sequestered
8 you have to worry about the probabilities of it, even if
9 you designed for a 50 year flood, you may get the 100 year
10 flood tomorrow.

11 So that -- that's why I put
12 the emphasis on highways. Problems are also bound to
13 appear if the pipeline ditch is open, the pipeline is laid,
14 and the trench is backfilled. I don't think you can anti-
15 cipate what you're going to find until you open that ditch,
16 so I would say in hydrologically unknown or sensitive
17 terrain, maybe pipelines should follow highways, fairly
18 closely that is.

19 If the Dempster Highway is
20 added to the Alaska Highway, a somewhat nearer balance of
21 hydrologic concerns between the proposals is reached. I
22 wrote that sometime ago, and after going up around the
23 Klondike and down the Alaska Highway, I feel that it has a
24 much greater advantage over the Mackenzie than I thought
25 previously.

26 My choice would be the

1 Klondike to Dawson route, and that's about it.

2 MR. CHAIRMAN: Thank you very
3 much.

4 I think you've opened up a
5 few areas here that we haven't spent time on in hearings to
6 date, and I'll ask a couple of questions and then ask the
7 panel if they have any more.

8 The excess spoil, because of
9 -- during winter construction when you have snow and ice
10 mixed with the backfill, and place the snow and ice in the
11 trench, you have excess spoil, which becomes a problem,
12 -- as you pointed out, but does the actual amount of snow
13 and ice in the backfill, is that also a problem?

14 MR. MCKAY: Well, I'm not
15 sure. I think it could be because I don't think that the
16 densities will be as high, and thus you may get infiltration.
17 You may get vectoring down the actual ditch. That is just
18 simply a guess.

19 MR. CHAIRMAN: Okay, the other
20 one I had was to do with ice roads and the possibility that
21 an ice road in the northern Yukon could exist over one or
22 two summers, I suppose, and therefore dam water courses
23 and generally disrupt flow, and would you expect a similar
24 situation on the Dempster, as you did on your Trans-Yukon
25 route?

26 MR. MCKAY: Well, the Dempster

1 Highway generally, I think, follows or goes along with the
2 major hydrologic grain, if you will, and I don't think you
3 would get the same effect. In other words, not sustained
4 for the same distance, at least.

5 MR. CHAIRMAN: Because it
6 generally follows the ridge tops and therefore, even if
7 ice did stay over the summer, there wouldn't be much ponding
8 because you're on the ridge top?

9 MR. MCKAY: Well, I think that
10 is one conclusion you can draw. I'm not terribly familiar
11 with any studies on the Dempster, as to where the routing
12 would go.

13 MR. CHAIRMAN: Now, you also
14 mentioned subsidence in the discontinuous permafrost zone
15 in the Mackenzie. You mentioned remedial measures would
16 be required.

17 During your experience with
18 the evaluation of that project, what remedial measures were
19 considered necessary, and the most popular?

20 MR. MCKAY: Well, I haven't
21 really any knowledge of what remedial measures would be
22 taken, other than they would have to, I presume, go along
23 the pipeline route for some distance, maybe at the wrong
24 time of year, because generally speaking, this would be in
25 summer when you have an active layer development, and if
26 you have to move heavy equipment in there to possibly put

1 in some gravel or what have you, to fill it up, or maybe
2 reseed it or whatever you do, I think that you wouldn't
3 have the access, because the highway -- at least in summer
4 it's because the highway isn't there.

5 MR. CHAIRMAN: Yes, the --

6 MR. MCKAY: Well, the southern
7 route, yes, I see there is a portion of it that is on the
8 west bank of the river, and the pipeline is on the east
9 bank.

10 MR. CHAIRMAN: Yes, one could
11 develop the scenario if the criteria was that the subsidence
12 area would have to always be filled in with gravel or some
13 material, that in fact you're developing a whole new road
14 on top of the pipeline and each summer placing gravel
15 material.

16 MR. MCKAY: Yes, I think so,
17 yes.

18 MR. CHAIRMAN: Any questions
19 from panel members?

20 Dr. Lacate?

21 DR. LACATE: I would like to
22 get a point of clarification from Neil Bouckhout, if I
23 could.

24 Mr. McKay has just noted the
25 point that he thought lateral erosion on the White and
26 the Donjek may be more significant than scour, and I can't

1 remember now whether your proposal was going to bury the
2 pipe in the White and the Donjek below a scour line for the
3 whole flood plain, or the present river course?

4 MR. BOUCKHOUT: I would suspect,
5 Dr. Lacate, and I'm not certain on this, but I'm near certain
6 that the depth of burial would account for the entire flood
7 plain, and this would also be relevant to the high energy
8 streams coming off the Kluane Ranges in the vicinity of
9 Kluane Lake.

10 MR. CHAIRMAN: Dr. Hughes?

11 DR. HUGHES: Were you implying
12 that this problem of mixture of snow with backfill was going
13 to be much more severe on the Yukon coastal plain than in
14 the forested areas? Was that your intent, or is this a
15 problem that's going to exist --

16 MR. MCKAY: I think it
17 will exist everywhere.

18 DR. HUGHES: -- everywhere?

19 MR. MCKAY: Everywhere where
20 you're doing construction in winter.

21 DR. HUGHES: So that your
22 --

23 MR. MCKAY: But I wasn't
24 aware --

25 DR. HUGHES: --- in part your
26 preference then is for the greater degree of summer

1 construction on the Alaska Highway route in the Yukon?

2 MR. MCKAY: Yes.

3 MR. CHAIRMAN: Any more
4 questions from the panel?

5 More questions from the
6 advisors, anyone wish to ask a question? Panel staff?
7 Dr. Schilder?

8 DR. SCHILDER: Mr. Chairman,
9 I have a question for Dr. McKay.

10 Unless I am mistaken, you
11 have mentioned in your brief, that in a hydrologically
12 unknown terrain, the pipeline should follow the highway.

13 My question would be, could
14 you comment on this idea in more detail on this subject,
15 and secondly, did you have any specific reach in mind
16 concerning any of the corridors discussed?

17 MR. MCKAY: I think hydrologic-
18 ally sensitive terrain is, if you think of the groundwater
19 aspect, that any kind of permafrost terrain is hydrologically
20 sensitive, and my -- when I talked about the necessity of
21 following highways, or having good contingency planning and
22 good highway access, it was simply a reflection of the fact
23 that hydrology is a probablistic sort of science, and the
24 fact that you can never know in advance exactly what
25 is going to happen.

26 My feeling is that in the

1 ground, certainly where it comes to the distribution of ice
2 within the ground, or the actual distribution of permafrost
3 in the discontinuous zone, or even in the continuous zone
4 where you have voids in it, you know, under lakes and under
5 rivers and what have you, that you would never really know
6 with any geophysical technique that I know of, just what the
7 distribution is.

8 Therefore, you are always
9 open to the problem of, after having laid the pipe, of running
10 into a condition that you weren't aware was going to happen.
11 Therefore, I think the contingency planning is most important
12 with hydrology.

13 DR. SCHILDER: I would like
14 to ask you a supplemental question. Have my feelings been
15 correct that you had in mind, mostly the more remote areas
16 along the potential future pipeline corridor, which would
17 follow likely the Dempster Highway, the climatic conditions
18 are very severe, and the areas are the most remote from the
19 point of view of other cities or communities?

20 MR. MCKAY: Yes, I didn't
21 really see too much between here and Dawson that would
22 require a pipeline right along the highway right-of-way.
23 Going from Dawson across to, cutting across to the Alaskan
24 border, it's very conceivable, because of the actual beauty
25 of the area, that you should have the pipeline either right
26 next to the highway, or far enough removed so you don't see

1 it, but this is the unglaciated area where you're up on the
2 ridge tops and running west into Alaska. It's just a little
3 bit of weathered material on top of bedrock. I think Owen
4 would know better than I, and very thin vegetation mat,
5 and this mat, in some of the high gradient slopes there,
6 has slipped off, and I would think that if you put a pipe-
7 line right-of-way across there, you might have some sort
8 of problem trying to retain the vegetation mat on top.

9 MR. CHAIRMAN: Any more
10 questions from panel staff?

11 Mr. Bouckhout, do you have
12 any comment?

13 MR. BOUCKHOUT: One question.
14 Dr. McKay, the topic of sedimentation has been brought up
15 here as a significant consideration. You did make a comment
16 on it, relative to natural sedimentation. I wonder if you
17 could expand on it, realizing that Mr. Stein may have
18 another interpretation, but I am rather interested in the
19 topic.

20 MR. MCKAY: Well, I look at
21 a river as simply, sort of a conveyor belt, and it's designed
22 by nature to carry sediment. In fact, if you didn't erode
23 some of the terrain, you wouldn't have a river to begin
24 with.

25 I think the river systems
26 generally are designed to take care of sediment, and so from

1 a hydrologic point of view, I don't think of sedimentation
2 as a problem, as such.

3 MR. CHAIRMAN: Any comments
4 or questions from the floor?

5 Yes, Mr. Stein.

6 MR. STEIN: Just a point
7 here, Mr. Chairman. I assume Mr. McKay, in his discussion,
8 was referring to rivers such as the Mackenzie itself,
9 Liard, the South Nahani, the Mountain, some of the major
10 west side tributaries. I think he would agree, however,
11 that this certainly isn't the case in the east side tribut-
12 aries, which are generally clear flowing and support
13 rather substantial fish populations, and it's these tribut-
14 aries that the pipeline would cross.

15 MR. MCKAY: Well, as I say,
16 from a fisheries point of view, then it's a problem, but
17 I still don't consider it a hydrologic one.

18 MR. CHAIRMAN: It depends on
19 whether you're looking at it from the fish side or the
20 hydrology side, it appears.

21 Any more comments for Mr.
22 McKay? Thank you.

23 Mr. Dalton Muir is next.

24 MR. MUIR: Mr. Chairman, there
25 are one or two aspects of Dr. Rennie's study that maybe
26 have not been put in sufficient perspective, so far. I'm

1 sorry I wasn't here prior to this afternoon's session.

2 I think it's worth noting
3 that Dr. Rennie's project was put together about a year ago
4 now; and the terms of reference were to do the appraisal
5 from existing information only, that there would be no new
6 field work possible. We were to use what was available
7 through any reliable source whatsoever.

8 At that time, some of the
9 options that are now quite popular, were not popular, they
10 were only theoretical possibilities, and at that time,
11 didn't appear to have high likelihood. In quite recent
12 times, that has changed, and we are now looking at some
13 rather popular routes that we didn't consider a year ago,
14 because they didn't look to be serious enough to warrant
15 in-depth study, and already our project at that time
16 appeared too complex for comfort, and we were trying to
17 reduce it to consideration of only the high probability
18 routes, rather than taking in every permutation combination
19 possibility.

20 There were many lacks of
21 information, areas about which we knew virtually nothing.
22 These were acknowledged in the various specialty reports,
23 and they're certainly acknowledged, as far as birds are
24 concerned. However, the assigned task was to go ahead in
25 spite of lacks of information, and express preferences,
26 regardless of the fact that we simply didn't know enough.

1 This is maybe being a bit presumptuous, however, that was
2 part of the terms of reference for the exercise, was to
3 express preferences based on what is known, and that's what
4 we did. We took what was known, and we expressed prefer-
5 ences, admitting all the time that they might not be valid
6 in view of what might be discovered recently.

7 Now, more recently, with new
8 emphasis on particularly the Klondike route, which we didn't
9 consider seriously at the time, because a year ago, the
10 thought was that gas would possibly come along the Dempster
11 and then go west into Alaska, where it would join the Alcan,
12 before re-entering Canada again at a lower latitude.

13 Because of this recent change,
14 I took the opportunity yesterday to drive the Klondike, and
15 as much of the Dempster as I was able to, and the experience
16 was very interesting, because it opened up a new area in my
17 thinking that I hadn't been aware of, and that is, from all
18 appearances, the Klondike Highway appears to be much richer
19 biotic environment, if you can comprehend these terms in
20 their broad sense. It's a much richer environment totally,
21 than appears to be the case on the Alcan running west from
22 Whitehorse here.

23 Practically all aspects of
24 it appear to be richer. There is better ungulate browse
25 range; more willow; more aspen at a level which could be
26 browsed; there are more wetlands and waterfowl on them,

1 visible from the road, at least. The valley is narrower and
2 more constricted, and it has much higher gradient terrains,
3 it is really very hilly and rough compared to the Alcan
4 where, Alcan west of Whitehorse here; where along the Alcan
5 there is a lot of essentially flat terrain, at least visible
6 from the highway, and therefore open as an option for laying
7 a pipeline.

8 The Klondike, as I said, is
9 much more constricted, there would be fewer options, and
10 there is much higher gradient terrain. There's more rock,
11 there are more shallow soils, and more apparent impediments
12 to laying a pipeline, and here I am straying a little out-
13 side the realm of logical interests, but be that as it may.

14 There are also more flowing
15 rivers, heavily flowing rivers to be crossed than were
16 apparent along the Alcan west of Whitehorse.

17 To sum up then, it appears
18 that the Klondike Highway has higher biotic values in total,
19 and this is a very broad brush treatment, and that is what
20 our study was all about; in general, higher biotic values
21 along the Klondike.

22 The Dempster was an eye-opener
23 also, inasmuch as the Arctic alpine tundra is a rare and
24 expensive exposure of this type of terrain, presently
25 available to the public by open access road. Therefore, it
26 has a lot of considerations in addition to purely

1 ornithological considerations. There are others which
2 possibly don't concern my specialty, but should be taken
3 into consideration, and that is that scenic and aesthetic
4 values can't be ignored, because another government depart-
5 ment has responsibility for such matters in the form of
6 national parks and related areas.

7 I noted that there are about
8 40 miles of open alpine Arctic tundra, varying from shrub
9 heath through grassedge meadows, and all variants of these,
10 and an organized drainage pattern with a fair amount of
11 standing water, and these were populated by ducks and shore
12 birds at the time.

13 Again, stepping a little out-
14 side of ornithol interests, I spoke with the camp manager
15 at the highway maintenance base at the Ogilvie River
16 crossing. He said he had been there 7 years, essentially
17 continuously, and it seemed the caribou moved through on a
18 number of occasions during migration, and he said that
19 they came right down through the camp area, in among the
20 buildings, showing no evident apprehension or concern, even
21 with the diesel electric generators thundering away like a
22 bulldozer at full power.

23 He said they paid no attention
24 to human beings, nor to dogs as long as they were on a leash.
25 He said the only time they appeared to show concern was
26 after they had been hunted and shot at a few times, and if

1 the dogs got loose and took after them and chased them, I
2 suppose, appearing to the caribou much as predatory wolves
3 would.

4 Apart from those remarks, I
5 think I'll suggest that if there are any questions concerning
6 the avifaunal portion of Dr. Rennie's project, I would be
7 happy to answer them, and let the matter rest there.

8 MR. CHAIRMAN: Thank you very
9 much. Are there questions from the panel?

10 Are there questions from any
11 other advisors? Mr. Chambers?

12 MR. CHAMBERS: Mr. Muir, I'm
13 just trying to interpret what you said there. If you had
14 had the previous knowledge or visual knowledge of the
15 Klondike and the Dempster before yesterday that you have
16 today, would your evaluation of the routes have changed
17 much or stayed the same, on the alternatives?

18 MR. MUIR: If I'd had that
19 insight at that time, I would have placed more concern value
20 on the Dempster, and would have increased preference for the
21 Alcan, based on its apparent lower value than the apparent
22 environmental quality that I observed on the Klondike
23 yesterday. I think it would reinforce the avifaunal view
24 of preference for Alcan, and it would increase caution in
25 the Dempster sector.

26 MR. CHAIRMAN: Could I follow

1 up that question, so we get it clarified? The Dempster link,
2 which you considered as part of the -- we'll call it the
3 Rennie study, I guess, the Dempster link included the Klondike,
4 did it not?

5 MR. MUIR: No it didn't at
6 that time, because a year ago, the thought was that if
7 Dempster was used, that the pipeline would come along the
8 Dempster until it met the Klondike Road, and then would
9 travel west through Dawson into Alaska and join the Alcan
10 pipe in Alaska, and then travel south and re-enter Canada
11 down at Beaver Creek, I think it is, in that way, and at
12 that time it appeared a shorter and more logical route
13 than coming down Klondike, and that's why I say, time and
14 changing points of view have altered what we thought of as
15 most rational a year ago.

16 MR. CHAIRMAN: Thanks for the
17 clarification.

18 Any questions from the floor
19 -- from panel staff first, I asked, didn't I? From the
20 floor?

21 Mr. Chambers?

22 MR. CHAMBERS: I guess the
23 question should be directed to Dr. Rennie then. I was under
24 the impression, and I think Mr. Bouckhout also asked the
25 question that when you were making the comparisons that
26 the Klondike was included, but I take it now that the

1 Klondike in fact wasn't included in the Dempster alternative?

2 MR. RENNIE: Well, I was just
3 trying to look at the map just now to check this point, and
4 I'm afraid the map I have here is a fairly small scale one,
5 but my impression was that the Dempster link that we studied
6 ran across and joined up just about at the boundary.

7 MR. CHAIRMAN: So it ran west
8 from Dawson to Tok, I suppose?

9 MR. RENNIE: Yes, yes.

10 MR. CHAIRMAN: Thank you, Mr.
11 Muir.

12 Dr. Thomas?

13 DR. THOMAS: Mr. Chairman, I
14 did not know that the contributors to Dr. Rennie's chapter
15 would appear, so I don't have a prepared statement, so what
16 I'll do is follow along the report that is added as an
17 Appendix to his chapter.

18 Also, I would like to preface
19 my remarks by stating that I'm only a paper expert when it
20 comes to knowledge of mammalian concerns in the Yukon, and
21 also in the Mackenzie Valley.

22 I was chosen for this exercise
23 because of my experience along pipeline routes in the
24 eastern Arctic, and therefore, I can't speak on all the
25 concerns along the various routes.

26 I also wish to reiterate some

1 of the constraints that were put on us at the time that we
2 did our exercise. We had one of those required yesterday
3 deadlines. Accordingly, my contribution on terrestrial
4 mammals was written in less than three weeks, from 24th
5 of September to 10th of October.

6 The other serious constraint
7 was on length. Dr. Rennie's chapter, "Environmental Concerns",
8 was to be 20 to 40 pages in length. With 13 contributors
9 to that chapter, you can see that brevity was demanded.

10 My submission was written on
11 a format supplied by Dr. Rennie, that is, only major con-
12 cerns were to be identified. These concerns were to be
13 assigned three categories, with one star signifying relatively
14 low concern, and three stars relatively high concern.

15 A one star rating does not
16 imply that the problem is insignificant, because we only
17 addressed major concerns, and there's various ways of
18 defining those, but one way would be that those are concerns
19 that must receive measures to mitigate them.

20 With these constraints, the
21 modus operandi was a quick review of available data, and a
22 telephone blitz on biologists.

23 Certain assumptions were
24 made, and these I'll read off. Some of have been stated
25 before by Dr. Rennie. One is that in permafrost regions,
26 the pipeline would be buried and refrigerated, and it would

(d) Detrimental contacts

1 between animals and man, and usually refer to things like
2 man/bear conflicts here and foxes being attracted to camps.

3 And the last one, number 5 is
4 increased utilization. This is a serious problem where new
5 access is provided into areas where game populations occur,
6 and it can be a serious problem, as long as all people
7 can't be restricted in the same way.

8 Now, of course, I had to
9 select important species, and these are pretty well the
10 same ones we've heard the last few days. They were based
11 on food sources, economic importance, whether they are rare
12 or endangered; those highly sensitive to disturbance;
13 international obligations -- here we deal with species
14 such as the polar bear where Canada does have definite
15 commitments to other countries, and also the last one is
16 dangerous species, such as grizzly bears.

17 Now, I won't follow through
18 the main text here where I talk about the various routes
19 and the concerns along them, unless you want me to address
20 certain ones, for example, the Old Crow situation was
21 pointed out and the Dempster Highway.

22 I think I will leave that
23 to my final comments and press on with the exercise as it
24 was set up.

25 After I outlined all the
26 problems along the various routes, in relation to these

1 criteria that I had set up, then I formed a matrix of con-
2 cerns versus the various pipeline routes, and found that I
3 was able to order the preference of routes, and I can give
4 you those for the various routes that we looked at.

5 Now, we'll just deal with
6 western Arctic gas. Order of preference,

7 Number 1, El Paso, and at the
8 time I ordered that number 1, I was just considering that
9 it wouldn't pose any problem with the terrestrial environment
10 in Canada. I didn't consider the possibility of collisions
11 along the west coast and so on.

12 Number 2, Alcan route.

13 Number 3, Foothills/Mackenzie
14 route. There might be some confusion here -- some people
15 refer to Alcan/Foothills. In this case, it was Foothills
16 always refers to Foothills and the Mackenzie, the so-called
17 Maple Leaf line.

18 Number 4 was the Canadian
19 Arctic Gas proposal through Old Crow, and the fifth one was
20 Arctic Gas through coastal Yukon route.

21 When we were asked to rank
22 the combination routes, the order of preference was:

23 Number 1, Alcan and Foothills/
24 Mackenzie route;

25 Number 2, Alcar/Canol route;

26 Number 3, Alcar/Dempster route;

I must clarify that the concerns that I ascribe to the Dempster, were those in addition to those of the highway. I believe that the highway could result in far greater impact on the Porcupine caribou herd than the pipeline, especially in the long run. Had the road not been there, I would have rated the concerns for the Dempster link much higher, but it is a fact that the road is there.

1 I also assumed that temporary
2 winter roads would be utilized during the construction phase,
3 and that only short spur roads from the Dempster to pumping
4 stations would be necessary. I also assumed that the pipe-
5 line would not deviate to any great extent from the Dempster
6 Highway.

7 MR. CHAIRMAN: Thank you very
8 much. Of course, we've heard a lot about the Porcupine
9 caribou herd in the last day or so, and no doubt over the
10 next few years, we'll hear a lot more. So the ranking, as
11 you see it, a pipeline through Old Crow would interfere
12 more with migration than -- more of the herd, more of the
13 time, or would it not?

14 DR. THOMAS: I think the
15 potential for interference of migration is just as great
16 on the Old Crow route as on the Dempster Highway, especially
17 since the highway will have an impact on its own right.

18 MR. CHAIRMAN: Thank you.
19 Any questions from the panel? Dr. Hughes?

20 DR. HUGHES: I just wanted
21 to make sure that I understood your rankings here. I wrote
22 them down. Your preference was for the Alaska Highway
23 route, plus the Maple Leaf route, for moving Alaskan gas
24 and Delta gas, is that correct?

25 DR. THOMAS: That's correct.

26 DR. HUGHES: And followed by

1 the Alaska Highway plus the Canol, and Alaska Highway plus
2 the Dempster, being third?

3 DR. THOMAS: That's correct.

4 DR. HUGHES: As opposed to
5 Alaska Highway plus Dempster being first in the overall
6 assessment by the group as a whole, is that correct?

7 DR. THOMAS: Yes, that is
8 right.

9 DR. HUGHES: I just wanted to
10 get some feel for -- perhaps then, I could direct a question
11 to Dr. Rennie, and it's one we have had with our own con-
12 sultants in Envirocon is what, can you give us some feel for
13 what the -- what overrode the mammal concerns say on the
14 Canol and the Maple Leaf route, to boost the Dempster up
15 to first place over the Alcan plus Dempster, to boost it up
16 to first place overall?

17 MR. RENNIE: Well, it really
18 is based on how many of the other concerns will rank in a
19 different way, and you try to give a weighting, and you try
20 and consider the situation. I must say that it's a subject-
21 ive process. It really isn't a quantitative process in
22 the normal sense of what a quantitative process would be.

23 I think there was a feeling
24 that although that is undoubtedly a major concern, that you
25 are crossing a migratory route, that it's perhaps less of
26 a concern than some of the others are, and that with the

1 right sort of constraints, you may be able to cope with it
2 successfully.

3 DR. HUGHES: Maybe I could
4 put it in a little different way, in the Envirocon assess-
5 ment, I believe they allocated something like 350 or 360
6 points out of a 1,000 weighting points for wildlife mammals,
7 furbearers. In your system, what kind of weighting did
8 they receive?

9 MR. RENNIE: Well, I don't
10 think we got down to, in such specific weightings as that.
11 I would be very leery about amalgamating any point ratings.

12 My feeling is that you could
13 give a 1 to 10 rating for each concern, but I would hate to
14 add up those 1 to 10 figures, because I don't think that
15 they necessarily are summatable, each one to the other. The
16 1 to 10 means something in respect of each species or each
17 concern, but when you group them together, you just can't
18 add them up in that way and get any sort of result that
19 might mean something.

20 DR. HUGHES: I'm led to
21 believe, and this is just a comment now, that you probably
22 gave a somewhat lower weighting to mammals than perhaps
23 what our Envirocon consultants did.

24 MR. RENNIE: It's quite
25 possible. I'm afraid I haven't studied the Envirocon
26 paper in detail.

1 MR. CHAIRMAN: Mr. Wykes?

2 MR. WYKES: Dr. Rennie, I
3 would like to get these two links clarified as to the exact
4 routes that you studied, and I have difficulty, in looking
5 at the map on page 10 of your submission. You did show a
6 line coming from Dawson down to Whitehorse, which I presume
7 follows the Klondike Highway, and this is referred to on the
8 map as routes and locations mentioned in the text, but I
9 understand that route was not considered in your evaluation;
10 the Dempster link went through into Alaska from Dawson?

11 MR. RENNIE: The impression
12 I have actually is that that was in fact the link that we
13 studied, the one that went down the Klondike in that way.

14 MR. WYKES: It did go down
15 the Klondike?

16 MR. RENNIE: Yes, that's my
17 impression.

18 MR. WYKES: Well, you show
19 both on the map, and that's why I guess I'm confused.

20 MR. RENNIE: Yes, yes.

21 MR. WYKES: And the other
22 one is, I would like to know where the Canol link actually
23 went when it -- I presume got to Ross River, whether or not
24 it followed the South Canol Road down to Johnson's Crossing,
25 or whether it followed either one of those two routings
26 along the Tintina Trench-Robert Campbell Highway

1 to tie in with the proposed Alaska Highway alignment?

2 MR. RENNIE: I think I will
3 have to refer to the detailed map over there, but --

4 MR. CHAIRMAN: Would you mind
5 referring to the map, we will take a 5 minute stretch while
6 we have a look.

7
8 (PROCEEDINGS ADJOURNED)

9
10 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

11
12 MR. CHAIRMAN: I think we
13 have got it cleared up now, if we could reconvene. If we
14 could reconvene?

15 MR. RENNIE: Perhaps I could
16 speak from here, Mr. Chairman, with the map. I think the
17 problem stems from some of the very simple problems that
18 one has, that the map in the brief is not a map that I pre-
19 pared, but it was one that was used because, as I think was
20 mentioned, all these things have to be done by yesterday.
21 But we were, at the outset, given a map. I must say it
22 wasn't a very good one, but at least it came somewhere
23 between that very small scale one and this large scale one,
24 and for the Dempster, it was as far as this point here,
25 Dawson, and then I think it went down to Whitehorse. That
26 was the original routing, the alignment.

Mr. Rennie
Mr. Bouckhout
Dr. Thomas
Mr. Surrendi

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1 Now, if in fact, some of the
2 team used something else, well that's the way it turned out.
3 As far as the Canol Road is concerned, it followed straight
4 down the Mackenzie, across the Canol to Ross River, and then
5 right across to I think, what is it, Johnson's Crossing,
6 that's the situation there.

7 MR. CHAIRMAN: Thank you very
8 much, Dr. Rennie.

9 Does the panel have any fur-
10 ther questions for Dr. Thomas?

11 Does anyone else have questions
12 for Dr. Thomas? Panel staff? The floor?

13 Mr. Bouckhout? Then Mr.
14 Surrendi.

15 MR. BOUCKHOUT: Just one
16 question. You mentioned that one of your assumptions was
17 that the pipeline right-of-way would not deviate, to a
18 great extent from the Dempster Highway. What would you
19 consider to be a deviation to a great extent, in general
20 terms?

21 DR. THOMAS: Oh probably a
22 mile or two.

23 MR. BOUCKHOUT: Thanks.

24 MR. CHAIRMAN: Mr. Surrendi,
25 and then Mr. Lister.

26 MR. SURRENDI: Perhaps this

1 is focused on Dr. Rennie. Could you elaborate somewhat on
2 the actual factors that were used in evaluating the final
3 route recommendation or selection, from the standpoint of
4 the specific resource concerns, or concerns of the various
5 disciplines? In this particular instance, I'm curious as
6 to what factors overrode the concerns of the mammalian
7 concerns here, from the standpoint of Porcupine caribou
8 herd particularly. That is, what factors were so great as
9 to override that concern?

10 MR. RENNIE: Well, I can
11 answer that by telling you first of all something about
12 the way the final overall preference was arrived at, and
13 then I'll try to deal with the second part of your question.

14 But for the first part, I
15 left it entirely to my various collaborators to express
16 rankings, and in individual cases they have used a numbering
17 system, in other cases, just an asterisk system.

18 I did not take any of the
19 numbering systems and add them up as such, but the final
20 assessment was based upon an amalgamation, if you would
21 like to call it that, of the different rankings, and I
22 think the reason for that is that I haven't much faith in
23 the numerical systems when they're combined, because I
24 don't think that, although we have a series of numbers in
25 each case, I don't think you can necessarily add them in
26 in quite that simple a fashion.

1 Now, I will agree, it's still
2 difficult to amalgamate the rankings, and I think on the
3 basis of the rankings that were obtained, the final result
4 was as I was given it; it was as I gave it, and it's quite
5 simply that if you give another ranking, you are really
6 giving a lower order of preference to many other environ-
7 mental components.

8 MR. SURRENDI: I think I
9 missed the answer to my question. I guess my question was,
10 if I can rephrase it, what specific factors outranked the
11 concern for the Porcupine caribou herd on this route select-
12 ion?

13 Was it water quality, or
14 groundwater hydrology or --

15 MR. RENNIE: You did specific-
16 ally mention the Canol Road. I think one factor that would
17 be against that would be the, perhaps very practical one,
18 that it was not considered one that was likely that any
19 industry would suggest, and therefore, a very impractical
20 route.

21 MR. SURRENDI: Is that an
22 environmental concern?

23 MR. RENNIE: Not directly,
24 I would agree with you, but indirectly, somehow the whole
25 comparison has to be kept within the limits of reality.

26 MR. SURRENDI: I have no

1 further questions.

2 MR. CHAIRMAN: Thank you.

3 Dr. Lacate?

4 DR. LACATE: Dr. Rennie,
5 perhaps I could rephrase that. Was there any mechanism
6 in your study approach, whereby one component could over-
7 ride all the others? In other words, wildlife could argue
8 and say I'm sorry, my concern overrides all six other or
9 seven other concerns? Was this a possibility?

10 MR. RENNIE: Yes, I think it
11 was quite a possibility, because there was a preliminary
12 report produced, which was circulated among all the contri-
13 butors, and comments were invited, and the initial appraisal
14 the overall appraisal was accepted by everyone, and in
15 fact, one or two people went on refining their contributions
16 in the light of further information, and there was an
17 opportunity to express disagreement, over the course alto-
18 gether, of something like three months.

19 So although the initial exer-
20 cise was a very hurried one, there was an opportunity both
21 to comment and to refine and to disagree, and in fact, as
22 a result of, I think, disagreement with the expressed partic-
23 ular wording in respect of caribou, I think greater
24 emphasis was given to that particular environmental species.

25 MR. CHAIRMAN: Mr. Chambers?

26 MR. CHAMBERS: I suppose it's

1 a comment. I wasn't satisfied with your last reply to Mr.
2 Surrendi. In fact, the Canol route, in fact I understand
3 how it got its name is Canadian Oil, a shortening of it, did
4 have a pipeline down it built for supplying oil from Norman
5 Wells to Whitehorse, but your reason was that no company
6 would suggest that kind of routing, I think it was.

7 MR. RENNIE: That is true, but
8 I think also that if one looks at the report in detail, and
9 you look at all the other environmental considerations,
10 the ranking goes against the Canol Road link, and if one
11 selects the Canol Road to accommodate caribou interests,
12 you will have a much larger task in explaining why you have
13 overridden all the other environmental interests.

14 This is not the problem; it
15 is obviously not a problem to the caribou specialists. It's
16 not particularly a problem to every other contributor, but
17 it is a very considerable problem to a person who is trying
18 to express a consensus view, and to meld different
19 interests, and I think the term that's used sometimes is
20 "trade-offs", but I would prefer to call it a sort of
21 balancing of interests.

22 MR. CHAMBERS: Yes, I can
23 appreciate that but I'm having trouble understanding, I
24 suppose, the rationale from your various disciplines going
25 into it, because seemingly, you know, the reasons I have
26 received from yourself and your panel so far, seem to be

1 somewhat suspect, as if there wasn't access but in fact we
2 know there was access. There is a road there now, at least
3 to the Northwest Yukon border, and many of those factors
4 on which you have thrown it out, is not any kind of a real
5 viable alternative downgraded. It seemed to be, to me at
6 least in my mind, still somewhat of a question.

7 MR. CHAIRMAN: Maybe it's a
8 matter of us going through the detailed report and making
9 up on our minds on the ranking, given all the factors. I
10 don't think we can get into it today in too much depth,
11 unless some of ybur group has something to add on the Canol
12 Road.

13 You can understand the sen-
14 sitivity of the Porcupine caribou herd in this part of the
15 world, I think, Dr. Rennie. Maybe we can have one more
16 question from Mr. Lister?

17 MR. LISTER: I have a question
18 for Dr. Thomas. Perhaps I missed his explanation, but I
19 just wondered if you could expand on the reason for con-
20 cluding that as the Dempster Highway already existed, the
21 addition of a gas pipeline along that route or nearby,
22 would have less damage to wildlife than if the highway had
23 not preceded the pipeline?

24 DR. THOMAS: One of the
25 reasons why the concerns were not as high because the road
26 was already there, as they would have been if it was a new

1 corridor, is that, for example, one of my concerns was
2 access and increased hunting, and essentially, there will
3 be no increase there because of the pipeline, it's already
4 there, therefore, that is a low concern in relation to the
5 pipeline.

6 Likewise, harassment. Pro-
7 bably the harassment caused by normal traffic and so on down
8 the road, will far outstrip that caused by the pipeline,
9 except for the period when the pipeline is built, and so on
10 down the line.

11 The highway will cause impact
12 over as many years as it's in place, whereas the concerns
13 of the pipeline are relatively short term, provided -- and
14 this provision was built into this analysis -- provided that
15 reasonable precautions are taken to protect the environment,
16 and I think that almost goes without saying nowadays, or
17 should do so.

18 MR. LISTER: Thank you.

19 MR. DOYLE: May I ask just
20 one short question, Dr. Hill?

21 MR. CHAIRMAN: Certainly,
22 Mr. Doyle.

23 MR. DOYLE: Dr. Rennie, do
24 you and your expert contributors feel that the level of
25 analysis you carried out over this three week period, is
26 sufficient for Canada to make a national decision of this

1 magnitude?

2 MR. RENNIE: Well firstly, it
3 was much longer than a three week period. It was more like
4 a three month period, because as I just said, the initial
5 analysis was prepared, and a report prepared and it went
6 back to the original contributors for comment, and several
7 contributions were refined to produce the final edition, so
8 it really is much longer than three weeks.

9 As regards the second part of
10 the question, as to whether that's adequate for a decision
11 of this nature, I think, no it isn't, but it is an environ-
12 mental contribution which has to be considered along with
13 various other reports, the report of this Inquiry, the
14 report of the Berger Inquiry, the report of the National
15 Energy Board Inquiry, the Lysyk Inquiry, numerous other
16 concerns, social, economic and so forth, and for a broad
17 brush treatment, considering the varying states of know-
18 ledge, I don't think it's altogether a bad effort, consider-
19 ing the various factors.

20 MR. CHAIRMAN: Could we
21 move now to the next speaker, Mr. Stein?

22 MR. STEIN: Just a procedural
23 point here, Mr. Chairman. I had prepared a few questions
24 for Foothills. I am just wondering if there will be any
25 opportunity later in the proceedings to perhaps enter some
26 of these?

1 MR. CHAIRMAN: If Foothills
2 is willing to answer them, ask them now.

3 MR. STEIN: It's a bit lengthy,
4 maybe perhaps you would care to get through the rest of the
5 panel first.

6 MR. CHAIRMAN: Okay.

7 MR. STEIN: If I may, Mr.
8 Chairman, I would like to emphasize the fact that I have
9 restricted my comments to fisheries concerns relative to
10 the original Foothills/Alaska Highway Pipe Line proposal,
11 and the Canadian Arctic Gas cross-delta route. And I
12 should also point out that in attempting this analysis, I
13 did not have access to recent information concerning Foot-
14 hills route alterations, so I will apologize now for any
15 variation between my figures and those presently being put
16 forward by Foothills.

17 Similarly, I have not had
18 access to information concerning the Yukon alternatives
19 which have been discussed before this panel during the last
20 few days, and I must therefore urge the panel, when consider-
21 ing fisheries' implications associated with Yukon pipeline
22 routings, to give the appropriate weight to the comments
23 provided by my Pacific region colleagues, within whose
24 jurisdiction the Yukon Territory lies.

25 I would also like to point
26 out that my comments, out of necessity, are quite subjective,

1 primarily due to the extreme paucity of fisheries data
2 relative to the Foothills' proposal. So I have therefore
3 not attempted a comparison of fish species, their sensi-
4 tivities or probable reactions to disturbances such as
5 sedimentation.

6 Suffice it to say that fish
7 losses will result from construction of either the CAGPL,
8 meaning Arctic Gas, or Foothills' proposals, and what I
9 have prepared is a brief outline of variations between the
10 two proposals, which could significantly influence the
11 degree to which disruption of fish resources or their habi-
12 tats may occur within the Yukon or Northwest Territories,
13 and this is perhaps somewhat of an elaboration out of the
14 material that went into the noted Rennie report.

15 One major variation between
16 the two proposals is obviously ease of access. The route
17 proposed by Foothills closely parallels the existing Alaska
18 Highway throughout its 512 mile Yukon portion, thus enabling
19 materials and supplies to be trucked on site with a minimum
20 of new road development.

21 By comparison, CAGPL proposes
22 to make use of snow and ice roads and barge transportation
23 for shipping purposes.

24 Now fisheries concerns, in
25 part, centre around the following:

26 Number 1: Alyeska found that

1 winter operations to be impractical, resulting in the
2 construction of all-weather roads and summer operations.
3 Fisheries people involved with Alyeska generally agree that
4 road construction has been more detrimental to Alaskan
5 fish resources than the actual building of the pipeline.

6 If, as I suspect, winter
7 construction proves no more feasible in the Canadian Arctic
8 than it did in Alaska, the CAGPL line will necessitate
9 construction of haul roads across the north slope, the
10 Mackenzie Delta, and through much of the Mackenzie Valley.

11 The Foothills project should
12 require considerably less modification as the result of
13 the existing highway, and since, as I understand it, only
14 approximately 111.4 miles are presently slated for the
15 winter construction.

16 Number 2: The majority of
17 supplies for CAGPL will be barged down the Mackenzie,
18 requiring construction of approximately 14 wharf sites
19 along the river, and Beaufort Sea coast, plus haul roads
20 from wharf and stockpile sites to right-of-way locations.

21 Foothills will require no
22 wharf sites, and less frequent and relatively shorter haul
23 roads.

24 Number 3: The use of water
25 transportation by CAGPL greatly increases the probability
26 of spills of materials detrimental to aquatic organisms and

1 eco-systems. Available technology for the control and
2 clean-up of spills on a river such as the Mackenzie or in
3 the Beaufort Sea, is at best untried under spill conditions.

4 Number 4: Assuming a spill
5 or line failure on the CAGPL right-of-way, especially during
6 summer, the company proposes to make extensive use of heli-
7 copters and low ground pressure vehicles to lessen terrain
8 disturbance and its resulting effects on aquatic eco-systems.
9 However, it would be the control and security of the pipeline
10 which takes priority, and extensive movement and use of
11 heavy equipment over sensitive terrain seems inevitable.

12 I do not feel satisfactory
13 environmental controls can be realistically applied under
14 emergency conditions, and as a result, disturbance to
15 aquatic eco-systems is highly probable.

16 Now, this is not to say that
17 similar impacts -- sorry, this is not to say that similar
18 impacts will not occur on the Foothills' route under emer-
19 gency circumstances, but only that access via the Alaska
20 Highway, will enable short time response and minimize
21 terrain disturbance and associated environmental impacts.

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The availability of granular materials also varies between the two projects and creates a further concern to fisheries, since, when land sources are limited, stream gravels are normally sought as an alternative. Gravel supplies are apparently abundant along the Foothills route and there is also the opportunity to make use of sources already developed through construction and maintenance of the Alaska Highway, however, granular materials are scarce in the Mackenzie Valley and stream gravels are generally of great importance to fish resources. Extraction could result in irreparable damage to local fish populations.

Increased fishing pressure will result, obviously, with the construction of any northern pipeline due to the improved access provided. However, I consider effects will be greater with CAGPL, whose proposed route crosses numerous tributaries inaccessible to date. Most streams affected by Foothills have already been crossed by the Alaska Highway, and as such, have been subjected to increased pressure, especially that associated with tourism.

Similarly, I feel that the probable impact on domestic fisheries will be considerably less on the Foothills route since:

One. The route is shorter.

Two. The amount of resource

1 use is less due to a smaller population dependent on fish
2 and wildlife resources and,

3 Three. The detrimental
4 effects resulting from increased access have already been
5 felt.

6 An obvious difference between
7 the two proposals is relative length. Approximately,
8 one thousand six hundred and thirty miles for CAGPL versus
9 five hundred and twelve miles for Foothills within the
10 two territories. The shorter Foothills routing will reduce
11 the number of stream crossings, especially within high
12 permafrost areas where terrain stability becomes a critical
13 factor in determining the impact on aquatic eco-systems.

14 Further, CAGPL generally
15 requires the crossing of rivers whereas Foothills tends to
16 parallel most systems. Assuming a suitable setback distance
17 is imposed on Foothills, sedimentation effects on aquatic
18 eco-systems should be minimized.

19 In summary, Mr. Chairman,
20 these are some of what I consider to be major differences
21 between the two pipeline proposals which will partly
22 determine the relative degree to which fish resources and
23 their habitats are disrupted.

24 (1) The access provided
25 by the Alaska Highway will minimize Foothills' requirement
26 for new road construction.

1 (2) The access provided
2 by the Alaska Highway will minimize response time in
3 reacting to emergency situations on the Foothills right-of-
4 way as well as environmental disturbance associated with
5 clean up or repair activities.

6 (3) CAGPL will require
7 the construction of and road access from at least fourteen
8 wharf sites on the Mackenzie River and Beaufort Sea coast.

9 (4) CAGPL's dependence
10 on barge transportation will result in a greater probability
11 of toxic spills occurring.

12 (5) The greater availability
13 of granular materials along the Foothills route should minimize
14 requirements for stream gravels.

15 (6) Increased fishing pressure
16 and impacts on local fisheries should be less along the
17 Foothills route.

18 (7) The shorter length of the
19 Foothills route reduces the number of necessary stream
20 crossings.

21 On the basis of these
22 differences alone, then, it's my opinion that construction
23 of the proposed Foothills pipeline will result in less
24 significant disruption to fish resources than will that
25 proposed by CAGPL.

26 That was the end of my

1 preparation but there is one in the interest of brevity
2 that I obviously did not put in there and that is the fact
3 that Foothills has the added advantage of not requiring
4 a crossing of the Mackenzie River delta which is undoubtedly
5 the most significant piece of fisheries habitat in the
6 entire Mackenzie Valley.

7 MR. CHAIRMAN: Thank you
8 very much Mr. Stein. There is one question arises. I
9 believe earlier on in these proceedings we heard that
10 a close paralleling of river systems could cause as great
11 a concern as the actual crossing of them and you seem to
12 suggest that the other is true. That the actual crossing
13 is of more concern than a long paralleling of river courses.
14 Would you like to comment on that?

15 MR. STEIN: I wouldn't want
16 that to be taken out of context with what I presented. In
17 general, I am opposed to the paralleling of river systems
18 by any sort of development. I made that statement, though,
19 with the proviso that the setback distance would be
20 suitable along with other mitigating measures that primarily
21 sediment effects could be minimized.

22 It was also mentioned to me
23 at one time that there was the probability there of
24 routing the pipeline, possibly, on the upslope side of
25 the highway, therefore, using the highway right-of-way,
26 more or less, as a sediment trap between it and the river

1 systems.

2 MR. CHAIRMAN: Thank you for
3 the clarification. Any other questions from panel members?
4 Mr. Wykes?

5 MR. WYKES: Mr. Stein, you
6 mentioned that the roads along the Alyeska Pipeline, perhaps
7 caused more destruction to the fisheries resource than the
8 pipeline itself. Was that indirect effects of the roads
9 in terms of fishing exploitation and so on or direct
10 effects, or a combination?

11 MR. STEIN: Well, these are
12 direct effects and they're associated, at least in my
13 experience, with any road development in the north. You
14 have several factors which are common, actually, to both
15 pipeline construction and road construction. Things such
16 as the requirement for granular material, sediment effects,
17 so on. But there are many other things and, of greatest
18 importance, I would say, would be the probabilities of
19 creating blockages to migration both upstream and down-
20 stream, improper culvert installations, these type of
21 factors.

22 MR. WYKES: Thank you.

23 MR. CHAIRMAN: Any questions
24 from advisors? Mr. Bouckhout.

25 MR. BOUCKHOUT: Just one
26 question, I'm sure it may be almost impossible to answer.

1 What would you consider a suitable setback distance from
2 streams where one is paralleling streams?

3 MR. STEIN: You're right.

4 That's an impossible question for me to answer. I do not
5 have enough familiarity with the terrain and the systems
6 involved in the Yukon and actually, that is one that I
7 would prefer to defer to our Yukon people if they would
8 care to comment on it. I think that's really about all I
9 could say on it.

10 MR. CHAIRMAN: Panel staff
11 have any questions? Mr. Lister.

12 MR. LISTER: Mr. Stein, you
13 mentioned that there were fewer stream crossings on the
14 Foothills/Alcan route than the Canadian Arctic Gas route. Could
15 you give us an approximation of the magnitude of difference
16 in each case?

17 MR. STEIN: I don't think
18 that I could on total numbers. In some of the information
19 that I've gone through, some of the references that I have
20 seen indicated, and this is within high permafrost zones,
21 fifty-one stream crossings for CAGPL and forty-three for
22 Alcan, now these are major stream crossings which I can
23 define if you wish. However, the reason why I struck this
24 was primarily due to the fact that I believe this also
25 includes the Alaska portion of both lines and I'm uncertain
26 as to how many were on either side of the line.

1 MR. LISTER: I was
2 more interested in just the sort of proportionate
3 difference, not the absolute difference.

4 MR. STEIN: That's about all
5 I could offer at this time other than the fact that Mr.
6 McKay has pointed out that there are approximately six
7 hundred stream crossings involved on CAGPL.

8 MR. LISTER: I have a little
9 difficulty comparing that to the Alcan though, depending
10 on the section that you chose. The other point I'd just
11 like to follow on from Dr. Hill's question on clarification
12 regarding the relative impact, I guess, of crossing
13 streams rather than paralleling them. Would you agree that
14 the impact of paralleling a water course, from a fisheries
15 point of view, would depend very greatly on the circum-
16 stances, the slope of the valley, the kinds of tributaries,
17 and the amount of room for setback from the river itself.

18 MR. STEIN: Yes, I would
19 certainly agree with that.

20 MR. LISTER: Thank you.

21 MR. CHAIRMAN: Dr. Schilder?

22 DR. SCHILDER: Mr. Chairman,
23 I have a question for Mr. Stein. You have indicated in
24 your brief how important sedimentation is from the point
25 of view/aquatic biology. Would you mind to offer your
26 comment to the panel on which route you would prefer. The

1 Alcan, I mean the Alaska Highway route or the Klondike
2 route.

3 MR. STEIN: I'm sorry sir,
4 but, again, as I say, I have no information at all on the
5 other Yukon alternatives and I just am very reluctant to
6 make comment on it.

7 MR. CHAIRMAN: Any other
8 questions from the floor? We'll move now then to Mr.
9 Harding.

10 MR. HARDING: I'd like to
11 if I may, discuss the background of environmental design
12 as applied to this project. The project being moving
13 western Arctic Gas to markets in the south. The department
14 started in 1971 to gather base line data to be able to
15 assess expected applications and supporting documents for
16 a pipeline.

17 The process was one of
18 progressively refining route selection and project design
19 as new data became available. In this aspect here we're
20 fully confident that, as Dr. Guthrie discussed yesterday,
21 the data base is never really fully adequate. Broad
22 decisions were made on the basis of data available and
23 then progressively refined or rejected as more data were
24 produced.

25 Perhaps to divert a brief
26 moment. Serious consideration of alternatives to a

1 Mackenzie Valley gas pipeline began in August of 1975 when
2 Mr. Justice Thomas Berger heard evidence regarding
3 alternatives in this area of the Yukon. These included what
4 was then referred to as the Fairbanks route which we now
5 call the Alcan route, and also what was then referred to as the
6 Fort Yukon route which we of course now call the Klondike
7 route. I believe those were virtually the same routes that
8 we're now discussing.

9 The department, of course,
10 reviewed those submissions and testimony in maintaining
11 our files on the environmental design as applied to the
12 broad project. Through our studies, field studies, which
13 were collected in continuing discussions with various departmental
14 experts as well as industrial representatives.

15 Now, in 1976 we produced a
16 document which has already been referred to, "Recommended
17 Environmental Standards for Design and Construction of a
18 Mackenzie Valley Gas Pipeline". It was our opinion, and
19 still is, if adequately implemented, these standards could
20 project the eco-systems involved or the eco-system
21 components from the impact of a Mackenzie Valley gas
22 pipeline and we envisioned these standards as being
23 probably similar to those which could be applied to a
24 pipeline across the southern Yukon as well.

25 Again to divert briefly, in
26 discussing environmental design, I'd like to point out a

1 disturbance is not the same thing as damage. We hear a
2 lot about the sensitive Arctic environment, the fragility
3 of Arctic/^{use}eco-systems and terms like that. I'm speaking
4 of a paper I read quite some time ago, and I don't have the full
5 reference. I believe the title was called Stability
6 and Fragility in Arctic Eco-Systems, which discussed
7 the wide fluctuations in populations both terrestrial
8 wildlife and fisheries populations, that occur in a certain
9 area over a season, also over a number of years. In
10 this regard there's a developing theory on caribou
11 population dynamics. There's really no data to support it
12 but it's a possibility that, for instance, caribou
13 populations have fluctuated very widely, historically and
14 pre-historically and it may not be valid to attempt to
15 maintain, for example, the Porcupine caribou herd at
16 one hundred and ten thousand animals.

17 By the same token, there was
18 a time when moose, for instance, were not known in Old
19 Crow Flats. Certainly I've talked to a great many Loucheux
20 from Old Crow who could not remember moose in the old times.
21 Or who at least remembered periods when there were no
22 moose and that species expanded its range greatly
23 and also population, so I think, due to the examples,
24 that there are many others. This ability, this great
25 fluctuation in populations connotes an ability to
26 withstand great perturbations. In fact, ^{it} might be termed a

1 certain resiliency as opposed to fragility. Certainly,
2 there are sensitive areas which could be severely affected
3 by impact and also you might term a permafrost layer as
4 being fragile in the sense if you alter the thermal regime
5 you have major geomorphicalogical changes.

6 Therefore, environmental
7 design has the objective of preserving habitats and restrict-
8 ing to certain disturbance such that the eco-system
9 components do not suffer irreversible or long term damage,
10 or, in other words, maintain integrity of the relationships
11 within the biotic environment which define the eco-system.

12 It's this background in
13 environmental design as applied to this project which I
14 was asked to develop in assisting Dr. Ray in this exercise.

15 The environmental design
16 problems that I looked at for this analysis were organized
17 according to the following basic outline.

18 There are potentials for environmental degrada-
19 tion, which included the magnitude of the project which
20 is primarily a function of length of the proposed pipeline
21 together with the sum of ancillary facilities such as
22 access roads, staging sites, compressor stations, and warfs.
23 Also sensitive areas which includes the amount of the
24 project, not only length of pipeline and roads, but also
25 the level of activity in sensitive terrain or sensitive
26 wildlife habitats where alignment and scheduling present

1 environmental and design difficulties and areas where
2 design is critical such as river, lake or marine crossings.
3 The nature of biological and geophysical and hydrological
4 concerns are discussed in other sections of the report and
5 not here. This is more of the design problems.

6 Amenability of the route to
7 emergency response, pipeline failure, compressor station
8 breakdown or other unforeseen situations may require immediate
9 high levels of activity. Success in responding to such
10 emergencies without undue damage or disturbance to the
11 environment is dependent on character of the route,
12 variability of the conditions and logistics and specifically
13 not on the respective abilities of the proponent companies.
14 That was just a point on methodology.

15 Scheduling activity, I
16 asked the question, how critical is scheduling considering
17 the sensitive ecological areas and seasonal phenomenon
18 and how many years will construction take.

19 Next category I call design
20 efficacy. It might also have been called Potential
21 for Mitigation. I asked the question, how adequate and
22 effective can environmental design be, given the present
23 state of site specific knowledge. What level of success
24 can be expected in designs for special problems which
25 have been identified, given known logistical problems
26 and variability of conditions. This depends partly on

1 the adequacy of environmental design, partly on logistical
2 support, partly on efficiency of the enforcement program,
3 and partly on the nature of special environmental design
4 problems.

5 I also considered alternative
6 alignments, the degree to which the route lends itself to
7 alternative alignments, alternative design, alternative
8 scheduling in order to avoid or mitigate
9 against conflicts with wildlife sensitive terrain or other
10 environmental concerns.

11 And lastly; accumulate
12 impacts, which deals with the additive and synergistic
13 effects of both.

14 (a) The pipeline with impacts
15 of previous developments, and

16 (b) The pipeline with
17 stimulation of future developments.

18 With that preamble, I'd like
19 to very briefly mention what I came up with and if there
20 are any questions on details of our reports or methodology, I'd
21 prefer to deal with those subsequently.

22 MR. CHAIRMAN: Dr. Hughes.

23 DR. HUGHES: Just as a point
24 of clarification, you mentioned the, I believe, the
25 Fort Yukon route. That route passed through Fort Yukon
26 and followed the Tintina Trench and in Judge Berger's

1 hearings, that route was found to have a major objection
2 in geotechnical problems northwest from Dawson, that it
3 doesn't, that finding didn't bear on the suitability of
4 the Klondike route because the Klondike route doesn't
5 follow that portion of the Tintina Trench.

6 MR. HARDING: Yes, I stand
7 corrected on that matter. The Fort Yukon ^{route} did indeed come
8 down from Fort Yukon. You know, it was quite different
9 on the Alaska side from what I think they're looking at
10 now. I was unsure whether it followed the Klondike River
11 or the Tintina Trench. I'm happy you enlightened me on
12 that matter. It was also, aside from geotechnic concerns,
13 it was rejected at that time by consensus of environmental,
14 particularly fishery and wildlife concerns on the Alaska
15 side.

16 DR. HUGHES: Thank you.

17 MR. HARDING: I might just go
18 on to mention then, the basis of my result, and that is that the
19 Alcan, what we now call the Alcan route, and the Foothills
20 Mackenzie Valley route came out just about equal in terms
21 of the overall environmental design problems which I expected
22 might be encountered. The north slope Mackenzie Valley
23 route was the least preferred primarily because of the
24 complexity of environmental design problems in the north
25 slope and in the Mackenzie delta.

26 I believe, and Dr. Rennie

1 may kick me under the table, I was, I think, the lone dissenter
2 on our general agreement that the Dempster Highway lateral
3 might be preferred over some of the others. I didn't
4 like that at all because I did not see a clear way to be sure
5 of mitigating the impact on caribou given the probability
6 of winter construction, which would be required because
7 of permafrost on the winter range of the animals or
8 alternatively for summer construction, in which case the
9 gravel work bed would be one more linear impediment to
10 caribou migrations. I think this is one of the main factors.
11 Also the route from Richards Island in the Mackenzie
12 delta down to Whitehorse was long, and through that
13 distance, there were quite a number of problems, environmental
14 design problems which could be encountered.

15 MR. CHAIRMAN: Does the panel
16 have any questions? Mr. Wykes?

17 MR. WYKES: Mr. Harding,
18 under cumulative impacts, did you, for the routes
19 starting in the Mackenzie delta, consider the possibility,
20 then, of an oil pipeline at a future date down those in
21 your assessments?

22 MR. HARDING: I'd have to
23 check my notes to be sure if I looked at an oil pipeline.
24 I did consider the possibility of increased development
25 of petroleum resources in the Mackenzie delta and whether or not
26 I specifically singled out a pipeline or whether I con-

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1 sidered a pipeline exploration, exploratory drilling,
2 production drilling, production facilities, I couldn't really
3 say. I believe I considered those all as one main group.

4 MR. WYKES: Then I guess,
5 a follow up question if I may, Mr. Chairman to Dr. Rennie,
6 is then Mr. Harding's submission the only one that perhaps
7 looked at the cumulative impacts?

8 DR. RENNIE: It's quite
9 likely. I think that a general framework was provided
10 but I left it to individual contributors to more or less
11 conduct their own analysis. They had the responsibility
12 of canvassing opinions and preparing the analysis according
13 to the way they thought best. And if a particular
14 contributor felt that he ought to include certain
15 possibilities if others didn't, well, I think that's very
16 much up to that individual authority.

17 MR. CHAIRMAN: Any other
18 questions from the panel? Any questions from the advisor
19 table? Dr. Beanlands?

20 DR. BEANLANDS: So far
21 we have two out of five who don't necessarily agree with
22 the Dempster rating. I wonder whether any consideration
23 was given to a minority report, perhaps that^{is}/not the right
24 word, but an alternative ranking system which would
25 reflect the differing opinion among the experts?

26 DR. RENNIE: Perhaps I can

1 backtrack a bit. When this exercise was set up the
2 authorities were selected at a very high level by
3 assistant deputy ministers from the various services and
4 in selecting authorities it was assumed that the people
5 were quite knowledgeable and fairly expert. But it was
6 also assumed that it's very difficult in a decentralized
7 organization with people with different specialties,
8 different species and so forth, to get, say, an authority
9 in fish, who is aware of perhaps the interest of several
10 major regions of Canada.

11 Now, the idea was present
12 that there would be collaborators helping these people and
13 that they would pull in what was necessary and I think
14 that in the terrain field, for example, which we haven't
15 heard much about, something like four or five people
16 contributed under the name of Dr. Skinner. Now, I
17 think also in Dr. Stein's case, there was a very widespread
18 canvassing of authorities in different, for different
19 species and different areas.

20 I'm not so familiar with
21 the other people, because unless they specifically
22 mentioned it, I'm not to know about it but I assume that
23 that was the case.

24 Now, when the final ranking
25 came up, as I said before, it was essentially a pooling
26 of preferences and that eight out of the eleven were for

1 the Dempster and there were two odd men out. Now this
2 report was referred back to the heads of the services and
3 they did not quibble with that and they agreed with it.
4 And if, at this particular panel meeting, there are now
5 authorities that disagree with that, then it's really
6 an expression of an individual opinion which has got
7 recognition and respect but it doesn't necessarily
8 counteract the consensus view that the head of the service
9 has agreed to go along with. And I think it's as simple
10 as that.

11 And I think if I were to give
12 preference to two, what I would call minority views, out
13 of eleven, I would have to explain why I would override
14 nine out of eleven viewpoints. And if I were to do that
15 I would have to call upon my other nine authorities to
16 explain why they were willing to be overridden.

17 DR. BEANLANDS: I understand
18 the complexities involved and what I was getting at is that
19 I am getting a slightly different opinion during the
20 discussions here today, than I received from reading the
21 report based on the use of words such as universal agree-
22 ment or almost universal agreement of something and, in
23 fact, your comments back up my, at least in my mind, my
24 suggestion that, was it necessary to come up with one
25 definitive ranking system even if the ABM's agreed with it.
26

1 Could it not have been possible to put forward at least a
2 secondary ranking system reflecting the, well let's call
3 it disagreement: that exists among the various --

4 DR. RENNIE: Well, really
5 speaking, there is a secondary ranking system within the
6 report. It's there. You only have to look at the tables
7 and you can just add up the numbers. I would say that
8 there's eight out of eleven in favour of one thing and
9 I would call that a fair measure of agreement, or majority
10 agreement. When there isn't agreement it's clearly marked
11 in the report. Now there would be no objection whatsoever
12 for anyone to say that he doesn't agree with it. I would
13 have been quite willing to have accommodated a minority
14 report of that nature, if you like to describe it in those
15 terms.

16 There was no embargo but
17 what I would say is this, that if you are preparing a report
18 that is a recommendation and you leave the thing in a
19 very cloudy state and you don't express some sort of
20 preference, then it's very difficult for somebody else
21 to make any use of the report.

22 MR. CHAIRMAN: Any questions
23 from the floor? I would like to thank the Rennie group
24 very much for their presentation. We have dwelled on
25 questions of methodology, I believe, probably a little
26 more than we intended. There have been three different

1 methodologies presented during the sitting of this panel
2 on attempting to compare subjectively, or any other way,
3 different pipeline routes on the basis of very little
4 environmental knowledge. I think that we all have a lot
5 of questions about the methodologies and I think that we're
6 all learning the limitations of the different methodologies
7 and possibly, when I retire in a few years, someone will
8 have developed a methodology that is acceptable to everyone.
9 I think that we're a long ways from that.

10 I believe that I've learned
11 something about environmental issues, gotten a little
12 different perspective on them from the -- by looking outside
13 of the Yukon and looking at different alternatives,
14 especially in the northern section along the Dempster.

15 Would you like to say anything
16 in summation Dr. Rennie?

17 DR. RENNIE: Well, I think
18 you have touched on the very important point about the
19 difficulty of methodologies and I would hope with all your
20 gathered knowledge that it's going to be a very successful
21 edition when it's published.

22 To give you an example,
23 though, in that connection, I was glancing at a recent
24 text on the environmental assessment and innumerable
25 authorities contributed and there were something like ten
26 chapters but this very problem that we've been grappling

1 with today was not mentioned at all. How to mix apples and
2 oranges and come up with some sort of consensus rating and
3 it is really a very, very difficult problem, I think,
4 fundamental to ecology, and to environmental issues and
5 I think that by giving it the, if I may say so, giving
6 it the time that you have done so, Mr. Chairman, you've
7 probably made a very valuable contribution in focusing
8 attention upon an issue, which ecologists should give far more
9 attention to.

10 The only other comment I
11 would perhaps add, and that is, I think, at the outset
12 of this particular session, you pointed out two major
13 aspects and I think we've dealt a lot with the second
14 one but the first one, lessons from the Mackenzie, we
15 have perhaps not come directly onto. Having been
16 associated with the Mackenzie, I don't know quite how
17 to call it, whether a syndrome or a philosophy or whatever
18 is the appropriate word, since early '74 and followed
19 it through. I think perhaps the strongest thing which
20 was touched on ^{by} Dr. Surrendi yesterday and again today,
21 which is that if we are considering the impact of a
22 development, and we're trying to assess this, then we must
23 really look at the environment in totality. That is to
24 say, don't let's get quite out of proportion in talking
25 about a pipeline when there's a highway there which we're
26 not really according much attention.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. CHAIRMAN: There are a few questions about the Rennie Report and whether it was prepared for this Environmental Assessment Panel, and I'll attempt to clarify the situation and Dr. Rennie can further clarify it if I'm wrong. The report which Dr. Rennie was giving us the benefit of was written for Government last fall and actually was completed before we got started.

When the panel came into being, it became evident that we could use a comparison with the Mackenzie Valley route for the reasons I cited earlier. Consequently, the Department of Indian and Northern Affairs was approached to supply such a comparison. The Department of Indian and Northern Affairs took advantage of the people that had worked with Dr. Renny and consequently a lot of the same people are here today. Those people are not necessarily here to defend the report which Dr. Rennie presented. They're here on request through Indian and Northern Affairs, but originally it's my request to make this comparison for us.

I hope that straightens that out.

DR. RENNIE: Yes, that's

1 absolutely the situation.

2 MR. CHAIRMAN: Okay. Now
3 part of the team that Indian and Northern Affairs asked
4 to present information to us is made up by Murray Roed
5 and he's going to give us information on selected terrain
6 characteristics. Mr. Roed?

7 MR. ROED: Thank you very
8 much. Mr. Chairman, I'll just briefly sketch out my plan
9 for my presentation. With your permission, we have a
10 report which has been filed with you, ten copies of it,
11 and I will be referring directly to this report for the
12 first part of the presentation, and then I have prepared,
13 in response to your request yesterday, our informal talk,
14 several comments with regard to what we have learned in
15 the Mackenzie Valley that we could apply to studies in
16 the Yukon.

17 So, with your permission I'll
18 begin. Geoanalysis was contracted on June 17th, 1977 by
19 the Department of Indian and Northern Affairs to undertake
20 a comparative analysis of certain terrain features along
21 the proposed Alcan/Yukon Pipeline route and the proposed
22 cross-delta Mackenzie Valley Pipeline route in the Yukon
23 and Northwest Territories.

24 This is the location of the
25 pipeline studied as shown in figure 1 of this report. The
26 study was to concentrate on the relative potential

1 environmental impacts caused by the geological and geotechnical
2 conditions of the two routes, and the results reported to this
3 Inquiry at this date.

4 With regard to the sources of
5 information, existing sources of data were employed in the
6 study. Primarily this consisted of company pipeline
7 alignment sheets and drill hole data, Geological Survey
8 of Canada terrain sensitivity maps, reports by the
9 Environmental Social Committee, and consultants' reports,
10 especially those of Northern Engineering Services Limited,
11 Geoanalysis Limited, J. D. MALL (?) & Associates, and
12 J. C. STRONE (?) & Associates.

13 A selected list of references
14 is given at the end of this report. It is important to
15 point out that all the published sources of pertinence have
16 not been studied. Considering the volume of material avail-
17 able for the Mackenzie Valley, in reference to the Mackenzie
18 Valley Data Bank, this would take a considerable amount of
19 time. However, most of the site specific data available
20 has been considered.

21 Also, sources for the data
22 on specific sections of the two routes shown on this
23 wall here, they're not shown on the cross-section and are
24 not easily retrievable at this moment. The reason for
25 this is that the analysis is by its nature of reconnaissance
26 and scale as intended to be used graphically as well as

1 quantitatively. We didn't want to clutter up the cross-
2 sections too much.

3 It is not intended as a
4 thoroughly documented report because of the time constraints
5 of its preparation. All sources of information are, however,
6 amenable to full documentation. With regard to the
7 method of the study, topographic cross-sections along both
8 routes were first constructed at a scale of one inch to
9 four miles horizontally and a vertical scale of one inch
10 to one thousand. I'd like to point out at this time--
11 I'd like you to notice the vertical exaggeration on these
12 cross-sections.

13 There is a vertical exaggeration
14 of twenty times. So, when you look at it, in some places
15 we've got a pipeline going right up the side of a cliff
16 there. That's really not that steep. It's exaggerated
17 graphically.

18 The terrain data then as
19 derived from the Geological Survey of Canada maps for
20 the Mackenzie Valley route and Geoanalysis maps for the
21 Alcan route were transferred onto the cross-sections.
22 Other consultants' photogeologic strip mosaics and all
23 of the drill hole data of each pipeline route were then
24 examined along with the above data and the various ratings
25 for each terrain unit were then made by combining and
26 synchronizing the information as shown in the two figures

1 behind me.

2 Then the sum in miles of the
3 various ratings for each of the selected terrain features
4 was calculated for each route and finally a quantitative
5 comparison was made. The terrain and geotechnical
6 characteristics compared are frost susceptibility; the
7 amount of ground ice; slope stability; the slope instability;
8 erosion, that is erosion just in the valley of the various
9 stream crossings along the centerline of the pipeline.
10 It just goes from the top of the bank on one side to the
11 top of the bank on the other. Near surface bedrock and
12 icing or augeis and finally seismicity.

13 Now, I'll get into the
14 actual rating system as we proceed here. With regard
15 to the limitations of the work, considerably more terrain
16 information is available for the Mackenzie Valley compared
17 to that available from the Alcan/Yukon route. Therefore,
18 a higher level of confidence in the interpretation of
19 terrain characteristics is warranted for the Mackenzie
20 Valley route.

21 The lack of test hole and field
22 data along the Alcan/Yukon route is particularly noteworthy.
23 The lack of structural geology information and related
24 seismicity data for both routes is also noteworthy.
25 This disparity of available data is somewhat compensated
26 by a reduction to a common one to four mile horizontal scale

1 for both routes, but not entirely. Also, an obvious
2 fact, the Mackenzie Valley is nearly twice as long as
3 the Alcan/Yukon route.

4 There's a certain amount of
5 subjectivity in this analysis concerning, in particular,
6 the frost susceptibility rating, but also in the ratings
7 for the other terrain factors. Although the ratings
8 have been clearly defined and will be clearly defined,
9 other workers in this field could have somewhat different
10 opinions.

11 However, we have tried to
12 avoid potentially major differences of opinion by firstly
13 incorporating the basic fundamentals in which there is
14 widespread agreement and secondly, by relying heavily on
15 quantitative data such as drill hole geotechnical
16 information.

17 Topographic cross-sections
18 presented in figures 2 and 3 were constructed by projecting
19 route interception points into the line of section. In
20 some sections, the route is curved and the projection
21 therefore contains an error in distance of an estimated
22 plus or minus ten per cent. For the purpose of this
23 comparative study, the error is considered to be equal
24 on both routes and is, therefore, negligible.

25 Except in the case of ground
26 where estimates are made on drill hole data
ice/and also texture, all ratings are relative to the terrain

1 type which occurs in the area. Although this is a limitation
2 to the study, it is at the same time the only way in which
3 a comparison could be made in a short time on a more or less
4 uniform basis for both routes.

5 The first thing that I'll
6 talk about is the comparison of frost susceptibility.
7 Now in all of our ratings, we have three categories;
8 low, moderate and high. The low rating on these cross-
9 sections is not shown. It's blank. A moderate rating
10 is the thinnest black line; that is the thinnest black
11 line on the--and the thickest one is the high rating.
12 So, that explains the different thicknesses of lines
13 there. That's what this refers to.

14 As I go through the various
15 parameters, terrain or geotechnical characteristics
16 we evaluated, I will first of all start with the explanation
17 of the rating system and secondly, I will end with the
18 results of the studies. So, it's a very brief explanation
19 of both sections of each terrain characteristic.

20 So, frost susceptibility
21 first. Susceptibility to frost heave or ice lensing of
22 different soil types has been demonstrated to be of major
23 concern in the operation of a chilled pipeline in northern
24 terrain. The frost susceptibility of the major soil units
25 found along both routes has been categorized qualitatively
26 as being either low, moderate or high.

1 The rating system is based
2 on texture, the unified soil classification system, terrain
3 type and the drainage characteristics of the terrain in
4 which the soil is found along the pipeline right-of-way.
5 The rating system is summarized in a table, but generally
6 speaking, a low rating is relegated to granular soils
7 with good drainage.

8 A moderate rating refers to
9 more silty or sandy soils with poor to good drainage.
10 A high rating refers to fine grain soils where there's
11 considerable sand or silt, and where the drainage
12 is very poor. The results of this analysis, using this
13 rating system, the Alcan route contains eighty-four miles
14 of highly frost susceptible soils, ninety-two miles of
15 moderately frost susceptible soils and the remaining
16 three hundred and thirty-six miles have soils which have
17 a low heaving potential.

18 In comparison, soils along
19 four hundred and ninety-two miles of the Mackenzie Valley
20 route are considered to be highly frost susceptible, while
21 three hundred and twenty-seven miles and a hundred and
22 seventy-eight miles have moderate and low frost suscepti-
23 bility ratings respectively. It is apparent that the
24 Mackenzie Valley has much greater lengths of soils
25 susceptible to frost heave as is illustrated in table
26 2 which quantifies the results.

1 With respect to ground ice,
2 using the terrain interpretation and drill hole information
3 as a major criteria, ground ice contents of soil units
4 along both pipeline routes have been quantitatively rated
5 as low, moderate and high. The values of contained ice
6 in this rating system are related to the dry unit weight
7 of the soils and are given in table 3.

8 Low rating is below twenty
9 per cent. A moderate rating is from twenty to fifty
10 per cent, and a high rating is above fifty per cent. The
11 results using this rating system, soils along twenty-four
12 miles of the Alcan route are considered to have a high
13 ice content. Forty-nine miles have soils of moderate
14 ground ice content while the remaining four hundred and
15 thirty-nine miles have a low ice content.

16 Mr. Hallet will point out
17 a few of these things on a cross-section. I don't expect
18 you to read the cross-section from across the table there,
19 but it would give you an idea of what we're talking about
20 so you can relate a little better. Okay, I'll just
21 repeat that. Using this rating system, soils along
22 twenty-four miles of the Alcan route are considered to
23 have a high ice content, forty-nine miles have soils of
24 moderate ground ice content, while the remaining four
25 hundred and thirty miles have a low ice content.

26 Two hundred and sixteen miles

1 along the Mackenzie Valley route have a high ice content.
2 Three hundred and seventeen miles, a moderate ice content
3 and four hundred and sixty-four miles have a low ground
4 ice content.

5 It is apparent that in terms
6 of miles the Mackenzie Valley Pipeline crosses considerably
7 more terrain with high ground ice than the Alcan route, as
8 illustrated in the quantified table in the text.

9 With respect to slope
10 instability, qualitative descriptions of the most common
11 slope instabilities in northern terrain along with their
12 potentially damaging effect on a buried pipeline have
13 been used to form the framework of the comparison of
14 unstable slopes.

15 Terrain, subject only to
16 minor slumping of short slopes and minor solifluction
17 of colluvium is considered to have a low rating since
18 these processes should not disturb a buried pipeline to
19 any appreciable extent. Terrain which is subject to
20 shallow-seated slumps and more severe solifluction
21 flows are considered to be moderately unstable since these
22 processes may affect the pipeline, but should not seriously
23 threaten its integrity.

24 Also, there is a low probability
25 of a major landslide occurrence in terrain rated as being
26 moderately unstable. Terrain in which a deep-seated major

1 landslide is or has occurred in the past or could likely
2 occur in the future is given a high rating. A high rating
3 also refers to terrain subject to debris flows and
4 extensive solifluction flows.

5 Based on this rating system,
6 approximately nine miles of the Alcan route are considered
7 to be highly unstable, while thirty-one miles and
8 four hundred and seventy-two miles have moderate and
9 low comparative ratings respectively for the slope's
10 instability.

11 Approximately nine miles
12 along the Mackenzie Valley route are considered to be
13 highly unstable and the remaining nine hundred and eighty-
14 eight miles have a low rating of instability. Both routes
15 have the same comparative ratings for major landslides.
16 However, there are thirty-one more miles of terrain
17 rated as moderately unstable along the Alcan route as
18 compared to the Mackenzie Valley route. Table 5 summarizes
19 these results.

20 With respect to erosion, that
21 is erosion at the creek and river crossings. There's
22 one other aspect of erosion that is included here, because
23 it is unique to the Alcan route and it's aeolian
24 activity. Localities where aeolian activity and minor
25 creek gullyng, scour and channel shifting occur are
26 rated as having a low erosion potential.

Major creek and river crossing localities where scour, channel shifting and gullying and sedimentation could adversely affect the pipeline are rated as having a high erosion potential. A moderate erosion rate could not be justified for this comparison. So, we have a high rate of erosion or a low rate. It's either one or the other. Basically the larger, more swiftly flowing streams are automatically rated as high as opposed to the smaller streams. This was done for both routes so you have a good solid base for the comparative analysis.

Twenty miles along the Alcan route and twenty-nine miles along the Mackenzie Valley route are considered to have a high potential for erosion. It is apparent that the erosion potential at stream and river crossings is somewhat higher along the Mackenzie route. Table 6 presents a comparative summary for erosion.

With respect to bedrock, near surface bedrock or surface bedrock, the bedrock rating is low in terrain with deep surficial materials; that is soils that are deeper than ten feet thick or where there is only a remote possibility of bedrock excavations.

A high rating refers to terrain with surface bedrock^{or} where bedrock is likely to occur within ten feet of the surface. A moderate bedrock rating

1 could not be justified for this terrain characteristic.
2 Again, it was either black or white. The results; Sixty-
3 four miles of the Alcan route are rated as high with respect
4 to bedrock excavations, while sixty-six miles are rated
5 as high along the Mackenzie Valley route. It is apparent
6 that both routes will likely traverse approximately the
7 same distance of terrain, which may require excavation
8 of bedrock which is summarized in table 7.

9 In all of these summary tables,
10 we have also included a calculation of percentage of the
11 total miles and, of course, in this case, for example,
12 where we have sixty-four miles of bedrock along the Alcan,
13 this represents 12.5 per cent of the route; whereas along
14 the Mackenzie Valley, which is about the same value in
15 mileage, this only represents 6.6 per cent of the route.

16 With respect to icing, icing
17 or aufeis is caused by barriers which interfere
18 with near surface ground water flow, forcing water to the
19 surface, and its subsequent freezing. Terrain in which
20 minor seepage runs occur perpendicular to the route is
21 given a low rating. A moderate rating is given to terrain
22 which contains numerous seepage runs, and which are
23 clearly visible. A high rating is given to wide alluvial
24 channels where of aufeis occurrences have been found
25 or where subsurface flow in the channels, winter flow
26 is suspected.

1 The results, a total of one
2 mile along the Alcan route, appears to have a high
3 rating. The remainder of the route is considered to have
4 a low icing potential. Approximately three miles along
5 the Mackenzie Valley route are considered to have a high
6 icing potential and thirty-one miles have a moderate
7 icing potential.

8 It is apparent, therefore,
9 that the Mackenzie Valley route has a higher icing potential
10 than the Alcan route; considerably higher. With respect
11 to seismicity, earthquake occurrences in northwestern
12 Canada have been summarized by Stevens & Milne, 1973. A
13 straightforward equally weighted comparison of relative
14 seismic risk for the two routes cannot be made at this
15 stage since there is more information from the southwestern
16 Yukon than in the Mackenzie Valley area.

17 However, using these statistical
18 data of Stevens & Milne as shown in figure 4 in the text,
19 and the available soils information, the following
20 comparison is presented. An acceleration of ten per cent
21 G is considered to be the damaging threshold for engineering
22 structures. For the purposes of this report, areas that
23 equal or exceed this level for a fifty year period, return
24 period, which is the life of a pipeline, are considered to
25 have a high seismic risk. Areas with predicted acceleration
26 which ranges from five to ten per cent G are rated as moderate.

Our conclusions of this study,

1 of the selected terrain and geotechnical characteristics
2 along the proposed routes has revealed a number of major
3 differences and a number of similarities. The Mackenzie
4 Valley route traverses four hundred and eight more miles
5 with soils that are highly frost susceptible as compared
6 to the Alcan route.

7 Also, soils which contain
8 a high percentage of ground ice occupy a hundred and
9 ninety-two more miles along the Mackenzie Valley than the
10 Alcan route. The extent of moderately unstable slopes
11 is greater along the Alcan/Yukon route but highly unstable
12 slopes are about the same. Erosion potential is somewhat
13 greater along the Mackenzie Valley route; whereas the
14 occurrence of surface or near surface bedrock is about
15 the same on both routes.

16 There is a slightly higher
17 potential for icing along the Mackenzie Valley route.
18 Seismic risk is much higher along the Alcan/Yukon route
19 where the seismicity rating is high for a total of
20 two hundred and sixteen miles. The Mackenzie Valley
21 cross delta route does not traverse any high seismic
22 terrain.

23 Now, there's one item that
24 I would like to add to this with regard to this comparative
25 rating and it's the item of ground water. I did not
26 look at the ground water in the Mackenzie Valley area, but

1 I would, with your permission, Mr. Chairman, like to comment
2 on--at least give you my opinion on the relative impact
3 on the ground water resources, despite my lack of knowledge
4 of the Mackenzie Valley.

5 The reason is that--it is
6 especially important in the Yukon where between eighty
7 and ninety per cent of domestic water supplies of ^{the} people
8 of the country is obtained from water wells. I feel that
9 this is an important item to consider for any impact
10 statement with regard to the pipelines going along these
11 relatively well-populated areas in the Yukon.

12 I would just like to indicate
13 that I feel that in comparison to the little I do know
14 about the ground water use in the Mackenzie Valley, I
15 feel that this resource in the Yukon is more sensitive
16 than it would be in the Mackenzie Valley; especially in--
17 not necessarily from the standpoint of just a gas line,
18 but the standpoint of a possible oil pipeline.

19 So, I would recommend, if I
20 may, that details of the ground water regime be included
21 and hopefully addressed by your Inquiry at some stage
22 as a recommendation for further study. Now, with regard
23 to general statements of what we have learned through the
24 Mackenzie Valley, my experience in the Mackenzie Valley
25 studies, I have several items that I'd like to point out.
26 One is of national importance, in my opinion. They're all

1 of national importance, of course, but one is extremely
2 critical. One of the main terrain--this refers to massive
3 ice and the occurrence of massive ice in northern terrain.
4 One of the main terrain geological and engineering lessons
5 that we learned in the Mackenzie Valley study is that we
6 know very little about the origin and process involved
7 in the occurrence of massive ice.

8 I view this as a major
9 scientific inadequacy considering Canada's northern frontier
10 position and the impending economic and industrial
11 activity that we are presently entertaining. This is an
12 item of national importance, and I strongly urge this
13 Inquiry to recommend to the Government to establish a
14 research group within the Government that will undertake
15 ground ice related studies so that our scientists will
16 become the leading authorities on this subject in the
17 world.

18 The benefits of breakthroughs
19 in this very important, but little understood aspect of
20 the terrain, are obvious, but the most important is that
21 we will be able to plan with confidence all of the various
22 engineering structures that will be required and we will
23 know or be able to predict what the environmental effect
24 will be, and engineering effect I might also add.

25 Today, in the Mackenzie
26 Valley or in the Yukon or any part of frozen ground terrain

1 in Canada, we do not have the privilege of that confidence.
2 To obtain this level of confidence, an all-out effort and
3 a great deal of initiative is required, and this responsibility,
4 in my opinion, lies with the Federal Government.

5 The Berger Report recommended
6 this study. I request that your panel consider this
7 and reemphasize the critical need for basic scientific
8 research into the origin and behavior of ground ice occur-
9 rences in Canada. With respect to other items that we
10 might have learned in conducting the Mackenzie Valley
11 study, there are a few very obvious ones, looking at all
12 of the different things that have happened with regard to
13 my particular area of expertise. Basically what we wanted
14 to do, obviously, is try to avoid ice-rich soils and frost
15 susceptible soils. That would be something that we learned
16 very early in the game.

17 Of course, avoid major hazard
18 localities, such as landslide localities or seismic risk
19 areas. These are all kind of fundamentals, but maybe I'm
20 reinventing the wheel here, but these are lessons that
21 came home time and time and time again. Another one to
22 avoid, major difficult river crossings. Very simple
23 statement, but very important one.

24 One other aspect that I
25 felt that--I don't know whether it's a matter of learning
26 or maybe it's a personal comment, but I think that others,

1 a few others which share my view, that probably a vast
2 amount of information that we do have for the Mackenzie
3 Valley--although I certainly have used it subsequent
4 to that. Perhaps a vast amount of data is not required for
5 a logical route selection in the early stages of corridor
6 development.

7 Rather, as exemplified by this
8 Inquiry, the comparative--asking for a comparative analysis
9 of these various routes is, in my opinion, a major step
10 forward and as long as the data is qualifiable in some
11 degree, and based on general reconnaissance by expert
12 investigators, but with some site specific details, this
13 seems to me an extremely valuable technique in providing
14 a framework for decision-making.

15 So, I feel we've learned
16 that and I think that's a major step forward. I think
17 that's about all I have to say. Thank you very much.

18 MR. CHAIRMAN: Thank you very
19 much, Mr. Roed. Are there questions from the panel? Mr.
20 Trevor?

21 MR. TREVOR: In your concluding
22 remarks, Dr. Roed, you recommended avoiding frost susceptible
23 and ice-rich soils. You also recommended avoiding areas
24 of high seismic risk. I wonder whether you'd care to give
25 us an opinion as to whether the Klondike route would lower
26 the seismic risk substantially as compared to the north

1 highway route?

2 MR. ROED: I would say without
3 going into a tremendous amount of detail that the Klondike
4 route would definitely offer a lower seismic risk.

5 MR. CHAIRMAN: Any other
6 questions from the panel? Dr. Hughes?

7 DR. HUGHES: You gave a
8 rating for the length of bedrock encountered. How do
9 you perceive bedrock as an environmental problem? In a
10 way one can regard it as an advantage in that once you
11 get a pipeline into bedrock, I presume it's going to stay
12 there.

13 MR. ROED: Right. I think
14 I would agree with that, Dr. Hughes. I guess it's the
15 engineering background coming out. It's an engineering
16 geology factor and I thought with respect to common sense
17 and logic that it would be better to favor one route
18 over the other with respect to the difficulty of engineering.
19 So, anytime you run into difficult engineering problems,
20 you also run into usually environmental problems with
21 regard to equipment, possible hazards to people, such
22 as blasting and this kind of thing. Environmentally,
23 that's the only way I could justify it. It's more of
24 an engineering consideration with environmental, minor
25 environmental spin-offs.

26 DR. HUGHES: I'd like to ask

1 one more question. Mr. Bouckhout, you've looked at this
2 figure here. How do you respond to that as a way of
3 displaying information on the possibility for displaying
4 information and assessments on alignment sheets? I think
5 particularly when I was travelling with the panel along
6 the Alaska Highway, that that sort of thing right below
7 the alignment sheets would have been very helpful to
8 me, and I think perhaps warrants consideration for any
9 sort of a standard technique.

10 MR. BOUCKHOUT: Yes, Dr. Hughes,
11 I think it's a very good graphic means of displaying
12 information in a form which is able to be assimilated.
13 In fact, you're aware probably that it is the technique
14 that was used on the Mackenzie Valley Highway studies.

15 We have for the Alaska
16 Highway Pipeline route prepared 1 to 50,000 map sheets
17 to do precisely that. In fact, I think the panel has
18 a copy and I know some of the other investigators already
19 have copies. We intend to utilize that scale as an
20 intermediary scale during preliminary and beginning into
21 final design, and when we reach the final design stage,
22 we will then probably go to the utilization of photo
23 mosaic strips as opposed to 1 to 50,000 as we get into
24 more detail.

25 But the maps we currently
26 have are 1 to 50,000 strip maps at the top with, in fact,

1 space at the bottom for exactly that kind of representation.
2 We are just now in the process of preparing the same
3 thing for studies on the alternates.

4 DR. HUGHES: Thank you.

5 MR. CHAIRMAN: Mr. Roed,
6 your definition of ground ice, high rating, was about
7 fifty per cent by weight.

8 MR. ROED: Water.

9 MR. CHAIRMAN: Water by
10 weight, yes. How did you deal with the depth factor
11 there? Along the Alcan route there's quite a lot of
12 frost susceptible soils that are above gravel.

13 MR. ROED: Right. Basically
14 when we've got a high ice-rich layer, you know, three or
15 four or five feet, the rating is based on that. Say the
16 upper ten feet. Usually that's the way we have rated
17 it. Taken a look at the upper ten feet, and in many of the
18 results along the Mackenzie Valley route, the Arctic
19 gas drill holes, they've got very detailed ice contents
20 going down there. You know, sometimes every two or three
21 feet they've got a value.

22 So, it was--we just took an
23 average usually. But basically it refers to the total
24 upper ten feet. I do agree that there are layers, especially
25 along the Yukon coastal plain, where you've got a very
26 high ice-rich layer of peaty soil overlying in some places

1 granular soil that doesn't have very much ice at all.

2 But when we've run into that
3 situation, we've called it a high ice content.

4 MR. CHAIRMAN: Thank you.
5 Any more questions from the panel? Questions from our
6 advisors? Mr. Bouckhout?

7 MR. BOUCKHOUT: One question
8 regarding ground water which you mentioned, Dr. Roed,
9 right at the end of your presentation. I've heard this
10 before. Perhaps Dr. McKay might wish to respond as well.
11 I'm just wondering what are the implications that you
12 see to ground water and are you aware of any examples or
13 instances where there have been ground water problems
14 related to pipeline construction or operation?

15 MR. ROED: Well, the first
16 part of your question; the implications--I'm just
17 concerned with domestic water supplies. As Dr. McKay
18 has already pointed out, the implications with regard
19 to building a pipeline in areas where there's near surface
20 ground water flow, and cold climate, are considerable.

21 I might say on this particular
22 point, if I may--talking with Carl Rickter just before
23 this presentation, he had mentioned that there are several
24 areas along the Alcan route which we did not know about,
25 that probably has more icing potential than we have
26 allowed for, but with respect to ground water, per se, as

1 a domestic supply, I think it's a critical resource, and
2 there are quite a few examples of ground water contamination.
3 I can't think of one specifically at the moment with regard
4 to actual pipeline failure. I'm sure there must be one.
5 I don't know of any documented case.

6 But everything else that
7 runs in pipes and is stored in tanks has weeped into
8 ground water supplies and has contaminated very large
9 areas, including subsurface waste disposal liquids.

10 MR. BOUCKHOUT: So, you would
11 view it primarily as a construction mode potential problem
12 as opposed to an operational mode, given that we are running
13 natural gas in the gaseous state?

14 MR. ROED: Well, that depends
15 on your--you know, I don't necessarily--I certainly
16 wouldn't restrict it to that, although I did put it in that
17 context when I gave the presentation, but even when you're
18 working around a village that does have a water supply, and
19 all the people are on water, I think some consideration
20 should be given to the storage of your fuel tanks, so that
21 they're located in a ground water discharge zone, rather
22 than a ground water recharge zone.

23 MR. BOUCKHOUT: Is the
24 interruption of ground water flow, as you view it, primarily
25 a factor with relation to a cold pipe and associated frost
26 bulb, or is it also a significant consideration with respect

1 to simply a warm flowing forty-eight inch pipe?

2 MR. ROED: What was the last
3 part?

4 MR. BOUCKHOUT: The latter
5 part was is it also a significant consideration with
6 respect to a warm flowing forty-eight inch pipe, no frost
7 bulb, in other words?

8 MR. ROED: In my opinion, I
9 don't think it has any impact at all.

10 MR. BOUCKHOUT: Thank you.

11 MR. CHAIRMAN: Panel staff?
12 Mr. Lister?

13 MR. LISTER: I'm referring,
14 Dr. Roed, to your page 11 of your report, a comparison
15 of erosion. You indicate that here you considered major
16 creek and river crossing localities. I was wondering
17 how many of these there would have been along the Alcan
18 route and just what size you considered to be major.

19 MR. CHAIRMAN: Would you
20 speak into the mike please.

21 MR. LISTER: I'll repeat
22 the question. It referred to the section on erosion.
23 I wondered what you classified as a major stream or
24 creek crossing along the Alcan route and just how many
25 of these there were.

26 MR. ROED: That's a good

Mr. Roed
Mr. Hallet
Mr. Lister

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1 question. I think most of the creeks and rivers along
2 the Alcan route were given a pretty high rating; the
3 reason being you're dealing with quite high terrain and
4 high gradients, and possibly torrential periods of flow,
5 as Dr. McKay has mentioned.

6 Actually it's those periods
7 of flow that we're really rating. I don't have any
8 size. We don't have very much data on it. I think Dell
9 Hallet, our engineer, can perhaps elaborate on that.

10 MR. HALLET: I guess I just
11 agree with Dr. Roed that we don't have any sizes and
12 we didn't count the number of major creek crossings. Dr.
13 Roed just informed me that we will count them after this
14 is over.

15 MR. LISTER: I was just
16 trying to get some comparison with the definition that
17 Foothills used in its application, and it came up with
18 something less than ten, I think, that were major or
19 considered major.

20 Anyway, it's a somewhat
21 arbitrary definition, but I was struck by the rather low
22 mileage of these crossings, and also by what you considered
23 to be erosion. It seemed to me to be more appropriate
24 to give it some other name or at least qualify it with
25 respect to the fact that it was within river valleys
26 and flood plains or something like that.

1 MR. ROED: Yes, I think that's
2 a valid criticism of the explanation in this submission.

3 MR. LISTER: The other comment
4 I had really on it was that if--well, the number of miles,
5 depending on how you define these extreme crossings, the
6 number of miles that you'll get could be high or low and
7 the statistic could be more or less sensitive and, in fact,
8 maybe the real comparison is the number of miles rated
9 as high between Alcan and Mackenzie, and in the one case
10 the Alcan is thirty-four per cent higher.

11 But you're dealing with
12 figures of 3.9 versus 2.9 per cent. So, it's difficult
13 really to evaluate it, unless one knows what you're
14 defining.

15 MR. ROED: Right. I know
16 exactly the problem you're having and it's exactly the
17 problem that we had when we were trying to do it. I
18 answered it to myself in this way; that for a specific
19 route, never mind the Mackenzie--say if we take the
20 Alcan route, the actual mileage that is affected may not
21 be accurate. Okay?

22 But if you use the same basis
23 of comparison for the Mackenzie Valley route, at least
24 you're making the same error. It's a common error and
25 the end product of this work was supposed to be a comparative
26 analysis, and from the standpoint of comparison, I stand

1 behind the data.

2 But you're quite right, if you
3 just take one route and just look at that route, then
4 the definition falls down, but if you remember that we're
5 comparing apples with apples, then it still holds up.
6 You can use it as a valid comparative tool, because the
7 measurements were taken like from the crest of the bank
8 to the crest of the next bank in each case, along both
9 routes.

10 So, that justifies the
11 comparative, quantitative comparison.

12 MR. LISTER: I recognize
13 the rush there must have been to get this report out.
14 It would just help somewhat if there were some more
15 details as to the methodology in this case.

16 MR. ROED: Well, I would
17 be happy to do that and to expand on any aspect of this.
18 As a matter of fact, the first draft--it must have been
19 about the third draft, each section was still above
20 six or seven pages long. I just said to myself, you know,
21 there's so many descriptions and descriptive data in the
22 definitions, that the Inquiry is going to be faced with a
23 volume of a hundred pages, and I thought it would be
24 better with respect to the length of the study and the
25 type of quantitative information they required to reduce
26 the descriptive sections considerably.

So, that was a deliberate

MR. LISTER: Okay. I appreciate

I wonder if you might be able to elaborate a little bit on the difficulties you had with data deficiencies. For example, I presume you had ready access to a relatively large number of drill hole results in the case of the Mackenzie Valley; where I also presume you were rather limited in that information on the Alcan. I presume you had the 1976 drill hole records from Alcan and I would assume that most of your information on the Alcan route came as a result of terrain analysis from a mere photo interpretation.

Would you like to elaborate

MR. ROED: Yes, certainly.

1 the number of drill holes that we would like to have, of
2 course. It was sufficient, I felt, to make a valid base.
3 The work was not solely air photo interpretation along
4 the Alcan route.

5 With regard to the western
6 portion of the route from Whitehorse to the border, it
7 has been mapped in the field by Dr. Ronton who is
8 a member of our study team, and he has numerous described
9 sections with details of stratigraphy, ground ice, and
10 thicknesses of deposits, slopes, drainage.

11 With regard to the eastern
12 part of the Alcan route, the soils there are not very
13 troublesome to begin with. They're very coarse grained.
14 That was my particular responsibility. I have driven
15 the route, and although I haven't done any detailed mapping
16 on it, there is a certain amount of field work there
17 also.

18 I don't think there are
19 any drill holes that I know of or very few in that section.

20 DR. BEANLANDS: Well, let
21 me ask you for your opinion then. When and if we
22 accumulate the same amount of information for the Alcan
23 route that has been accumulated for the Mackenzie Valley
24 route, would you assume that most of those dashed black
25 lines, under the vertical characterizations, will in
26 effect grow somewhat, particularly with regard to ice

1 content, freeze thaw potential, et cetera?

2 MR. ROED: I really don't
3 think they'll change that much. Well, this is an opinion,
4 of course, but I really feel that we have a fair amount
5 of data at this level of examination, and to feel pretty
6 confident that there's probably not going to be much
7 more learned.

8 From the standpoint of final
9 design, you need a lot more information, of course. It's
10 very important from the standpoint of final design, but
11 from the standpoint of a general evaluation, I don't
12 think it's going to change very much. I don't see how it
13 could, because we know where most of the permafrost is
14 right now.

15 DR. BEANLANDS: I take it
16 from what you're saying that for this kind of a comparison,
17 we have an adequate information base for both routes?

18 MR. ROED: I think so. We
19 have got way too much for the Mackenzie. I've already
20 made that point.

21 DR. BEANLANDS: I wasn't
22 worried about the Mackenzie.

23 MR. ROED: Pardon?

24 DR. BEANLANDS: I wasn't
25 worried about the Mackenzie route.

26 MR. ROED: Oh, I think we have

1 for the Alcan route.

2 MR. CHAIRMAN: Mr. Chambers?

3 MR. CHAMBERS: I think Dr.
4 Beanlands has probably just asked my question. I was
5 interested in one of your last statements in lessons
6 learned in the Mackenzie, when you summed up saying
7 that a vast amount of data is not required for deciding
8 on route selection, and we've had a lot of comments
9 over the last two weeks in regards to the deficiency of
10 data and so on.

11 I was going to ask that
12 question. Do you feel there is enough data on the Alcan
13 route to make a decision, some kind of a decision, on
14 its viability as a route?

15 MR. ROED: Yes, but--alone?
16 I feel that you have to have the same amount of data.
17 I think it's sufficient, but I think you have to have
18 the same amount of data for your Klondike route and your
19 Dempster Highway and all the other options; or else--
20 and perhaps you have. I haven't looked at those other
21 routes. I know Dr. Hughes and Dr. Campbell have done
22 a tremendous amount of work in this area, and perhaps
23 that information is available for the other routes, but
24 I would like to see about the same amount of data as
25 we have in the Alcan route now for everyone of the other
26 routes, unless you can rule them out, you know, obviously

1 at this stage with something very obvious.

2 MR. CHAIRMAN: Dr. Hughes?

3 DR. HUGHES: I think we have
4 to make it clear though that you're talking about the
5 geologic, geotechnical aspect of things, and I believe
6 that Mr. Rickter did point out, or perhaps it was
7 Mr. Parkinson, that of the various fields that they had
8 to assess, that their geologic base was relatively strong
9 compared with the others.

10 So, your comment doesn't
11 apply to fish or avifauna or--

12 MR. ROED: It doesn't apply
13 to what? I didn't hear you.

14 DR. HUGHES: It doesn't apply
15 to fish or avifauna or whatever?

16 MR. ROED: Oh no, certainly
17 not.

18 DR. HUGHES: We're talking
19 about geotechnical now.

20 MR. ROED: That's right.
21 As I say, I have not looked at that data. That is, you
22 may have enough and you may not have. I feel that we
23 had enough for the Alcan route at this stage. If you
24 had the same amount for the other routes, I would consider
25 that a very credible base on which to decide.

26 MR. CHAIRMAN: Any more

1 questions from panel staff? Any questions from the floor?

2 MR. LYONS: I'd just like
3 to ask Dr. Roed if he could clarify his statement regarding
4 ground water problems. When you say you feel there won't
5 be any significant problem with ground water, are you
6 thinking merely in terms of the pipe being in contact with
7 the ground water or are you also considering the possibility
8 of interception of the ground water?

9 MR. ROED: Well, it's a
10 generalization, but my concern with regard to pipeline
11 construction for a domestic ground water supply is one
12 of pollution, especially in relation to fuel storage areas
13 in the construction phase and possible cracks or leaks
14 in the pipeline itself so that the local supply gets
15 affected.

16 Certainly in permafrost areas
17 I don't think there's any possibility of near surface
18 contamination from a blockage of water, I should say,
19 in permafrost terrain, in real frozen ground, because
20 there isn't very much flow to begin with.

21 MR. LYONS: Maybe I'll just
22 point out that we have identified some concern with the
23 idea of ground water being intercepted and released to
24 the surface with some possible pollution problems, and
25 just interruption of ground water problems.

26 MR. ROED: Well, it must be

1 very shallow ground water that you're talking about. Maybe
2 you shouldn't be drinking it to begin with. It would have
3 to be very shallow ground water if it's going to be--

4 MR. LYONS: Well, we think
5 there will be some very deep trenches, and we just don't
6 know what's down there in a lot of cases. I just wondered
7 if you had any feeling.

8 MR. ROED: Okay, let's put it
9 this way. Within say ten feet of the surface--oh,
10 definitely when you get down into a deep excavation--we
11 have those problems right now in the Ottawa area where
12 they have intercepted an aquifer. With the potential of
13 depleting a reservoir, yes, definitely.

14 MR. CHAIRMAN: There was
15 another question or comment from the floor? Carl Rickter?

16 DR. RICKTER: You should be
17 listening to an expert instead of a bag man like me.
18 However, Murray, I can assure you that I do have a briefcase
19 full of data which you can work with to come up with
20 another good display in the graphics of the geotechnical
21 problems of the various alternatives in the Yukon. The
22 display on the wall, I think, is quite a fair one. It
23 agrees with what I have found. The icings, I think, are
24 a bit light. One mile icings in the Yukon I find very
25 hard to believe.

26 The Donjek River alone almost

1 accounts for one mile. So, I think the figure would probably
2 be more like twenty miles or so, if you manage to round
3 up all the old U. S. Army engineering reports on the
4 problem when they had a major disaster back in 1943/44
5 during construction of the highway.

6 I still maintain that that
7 will be one of the major problems they have when they do
8 the ditching job for the pipeline, and I do not really
9 know of any way to overcome a problem totally, Trying
10 to stay on the microtopographic divide will certainly help.
11 I realize you can only bend and twist pipes so far, and
12 they're going to have to be prepared to instigate very
13 fast remedial measures, as soon as ditching is done in
14 some cases, I suspect.

15 This leads on to the problem
16 of data. I agree with Murray. We have enough data on
17 most pipeline alternatives through the southern Yukon,
18 and I remarked to the Dempster the other day that we were
19 also suffering from a bit of overkill in the stage of
20 exploration and learning of pipeline routes.

21 But with respect to this
22 problem of icings, we will never have enough data. I
23 don't know of any way of how we can really get it other
24 than to keep up constant visions along the Alaska Highway
25 during the wintertime to see where all these problems are
26 and just keep careful records of them. This is a long

1 tedious task that will acquire a lot of useless observations
2 as well as the few good ones you manage to get. But this
3 was the sort of tactics that several military personnel
4 were forced to do during the war to try and keep the
5 highway open in the wintertime for the movement of the
6 supplies to Alaska.

7 The final proof off the pudding
8 will be the ditch itself, and as far as I'm concerned, as
9 a geologist, that's the best piece of subsurface information
10 you can have. So, really I think you're not going to
11 learn about all the problems by drilling. You're going
12 to have to be patient and wait until the ditch is opened,
13 and I think people should be cognizant of that fact. It's
14 a way of life in ^{any} excavation work. I don't know of any
15 exceptions frankly. Everytime they make an excavation
16 in Vancouver, there's always something ^{of interest} that turns up that
17 you didn't know about before. That's a well studied
18 piece of urban terrain in Canada.

19 With regard to the seismicity,
20 originally I was very concerned about it. In fact, I
21 managed to get a few lawyers mad at me about a year ago.
22 I ranted and raved about it, but I've since learned a few
23 things in the seismic trade. It requires a long peech
24 of an intense accelerated event to produce significant
25 damage to things like pipelines; an event which would
26 last several tens of seconds, such as what happened in

1 Alaska during the Good Friday earthquake.

2 Apparently the records in
3 Victoria do not show a sustained event for anything in the
4 Shakwak/Takhini Valley area to date, and so I am now being
5 led to conclude that the problem is not as big as we
6 originally thought it was at first.

7 Secondly, I think the
8 Foothills' design calls for over-weighting of the pipe
9 at the Slims River Delta, so that the thing will not
10 whiplash or bounce in the air if they do have a strong
11 event, and Mr. Fred Claridge assures us that the Delta
12 will not flow to sea, so to speak, and leave the pipe
13 hanging in thin air.

14 So, maybe the issue is not
15 as big as we originally thought it was. However, I do
16 agree that there is a risk all the way through to Teslin
17 and that line on the graph there is very valid, and I
18 do suggest that at river crossings in lacustrine silts
19 and glacial Lake Champagne there is still some concern
20 for seismic disruption. That, by the way, was one of
21 things that got a few points in my seismic impact in
22 my analyses. Just see if I've missed anything here.
23 The bedrock situation, I think when it comes down to the
24 final crunch, Foothills will not be excavating as much
25 bedrock as we think. I think they're going to be a little
26 more cost conscious and they're going to twist the line a

1 bit to keep it off the Cassiar batholith and things like
2 this. I know I certainly would. I can see them blowing
3 a bundle of money.

4 In my analysis, I did not
5 allow for that sort of blasting on their program, because
6 let's face it, it is a big environmental geological
7 nuisance. A blasting operation is never clean cut. It
8 creates lots of noise. It disturbs everybody, including
9 the flora and the fauna and whatever is flying in the
10 air at the same time.

11 The problems at Marsh Lake
12 I think can be by and large overcome by very careful
13 rerouting and I think at Jakes Corner, if they will finally
14 concede to the fact they might be going that way, they
15 will find that the bedrock problems down there are not
16 nearly as bad as they can visualize. I've been down
17 there recently and the Highways Department have neatly
18 cleaned off everything, and I think the problem was
19 overrated.

20 With regard to the bar graphs,
21 one of the things that should be pointed out that landslides
22 and the seismic are events of probability. So, it's not
23 really fair to present them as long solid lines. I don't
24 know how you would present it; maybe short dashed lines,
25 but it's not an impact which is going to occur for sure.
26 It's a probability. In the case of landslides and of a

1 seismic event, we're looking at fifty years in Murray's
2 analysis, and a hundred years in mine.

3 That solid line certainly
4 overstates the situation. Frankly, I'm quite impressed
5 by the bar charts and if he has the patience to try it
6 again, I have a whole briefcase full of information.

7 MR. ROED: Thank you, Carl.
8 I appreciate your comments. I think that I will address
9 them in order of the last one, starting with the last
10 first.

11 With regard to the extent
12 of these lines on here, I do want to reiterate that this
13 is a comparative study. We had to keep the same parameters
14 for both routes, more or less equal, or else we wouldn't
15 have a comparison. So, this was how it was rated
16 objectively, in my opinion. That's with regard to your
17 last statement.

18 As far as the bedrock is
19 concerned, we evaluated the line on the map, and whether
20 Foothills decide to move the line or not, that's/^{not}for us
21 to say or even guess. It's the line on the map and that's
22 what's underneath there.

23 With regard to seismicity,
24 perhaps we're in an area of inevitable geological inter-
25 pretation and we could conceivably go on all night and
26 discuss this, and each of us with equally good points.

1 But if I may just throw in
2 a little detail and it's an interesting one from the
3 standpoint of the Inquiry's business, because it brings
4 out something I had included in the second, third draft, but
5 took out. We did a lot of work on the seismicity
6 evaluation of this route, and one aspect of the work was
7 trying to find evidence, solid evidence, which is really
8 the only convincing proof of possible earth movement
9 in this area, and that is displacement of catenary
10 deposits. So that at least we know that there has been
11 movement since the glacier has disappeared over the last
12 ten thousand years.

13 I had intended to draw this
14 lack of data to the Inquiry's attention, but with the
15 briefness of the report, I decided not to, but I think
16 it's a good time to mention it. Just south of the Duke
17 River, in the Duke River system, there is a catenary
18 fault that has been identified--well, not identified for
19 sure, but in the opinion of Isbacker (?) of the Geological
20 Survey of Canada, there's been a displacement since the
21 end of glacial time of at least three meters.

22 Now, this isn't very far
23 from the Alcan line. Also, in Alaska, and I have the
24 reference in this, at the end here. Yes, it's reference
25 No. 41, Rickter and Matson Geological Society,
26 American Bulletin; catenary faulting in the eastern

1 Alaska range. This is along the Denailly (?) fault
2 system which the Shakwak Valley is an extension of, and
3 there's just widespread evidence of major movements,
4 displacement of alluvial fans in creeks. We're not that
5 far away from that.

6 Also, in the most recent
7 report of activities from the Geological Survey of
8 Canada, in the Mackenzie Mountains, on the other side of
9 the mountains, a post-glacial fault has been documented.
10 Now, this is an interpretation by field geologists and
11 which I intend to put a lot of weight on. I'm sure these
12 features have not been thoroughly analyzed by a great
13 number of geologists. So, there could be a difference of
14 opinion.

15 Also, at the same time, we
16 found other evidences of possible post-glacial movement
17 on the Aklavik range on the west side of the Mackenzie
18 River Delta, about half a mile from the Arctic Gas
19 pipeline. These features were not as convincing as the
20 other two, but it was enough to make me extremely con-
21 servative in my evaluation of the seismicity. We have
22 a possible movement of three meters not too far from the
23 Alcan route; and on the other side in the middle of the
24 next mountain range, we have more evidence of post-glacial
25 faulting. I got a little cautious because that's distinct
26 evidence of movement.

1 I stopped there because--and
2 I'm going to stop there now, because we're just at a point
3 in time that we just need more evidence with regard to
4 catenary displacements. I might also add that
5 we started to take a look at all the structural data in
6 both routes, and it turns out that there is just a
7 tremendous amount of structural data available. There's
8 nothing under one cover, and one of my recommendations
9 for further work was to take a look at this structural
10 data and see how it does affect the pipeline routing in
11 the comparison in selection of routes with regard to the
12 least hazard.

13 The other aspect, I might
14 as well go the whole way, is the concept of plate tectonics
15 that has emerged in the last ten years and has been a
16 significant breakthrough for global geologists, explorationists,
17 and petroleum geologists and other structural geologists.
18 We don't know anything about the plate tectonics
19 structure of this part of Canada other than that that is
20 connected with the Denailly and the offshore fault
21 system off of Alaska.

22 So, this was another area
23 where we were out in the dark. So, then I just decided
24 to use the statistical data of Stevens & Milne and carry
25 out a conservative--no more conservative than what they
26 recommend in their paper, and they did not specify the

1 length of these curves, of these peaks that you referred
2 to, Carl, in their paper. So, we had no way of evaluating
3 that and perhaps that should be taken into consideration.

4 But if post-glacial faulting
5 is found to occur in this area, then I think we've got
6 real trouble.

7 MR. CHAIRMAN: We're not
8 getting into a geological debate here.

9 MR. ROED: Not at all.

10 DR. RICKTER: Anyway Michael
11 Sidess has recorded on the Denailly fault by Boucher
12 and Fitch and that paper has been in the literature
13 for many years. I might be pronouncing the gentlemen's
14 names wrong but they are the experts on the Denailly
15 fault.

16
17 I don't deny that the thing
18 is active. I don't deny the Duke River fault or Sploups(?)
19 have ever been active recently. That evidence has been
20 broadcasted loud and clear by the Vancouver office of the
21 Geological Survey of Canada for one or two years now.

22 However, the activity of
23 major seismism is associated with the Queen Charlotte/
24 Fairweather fault these days as far as the Canadian cordellera
25 is concerned. That, by the way, is Pacific plate is
26 diving underneath the North American plate in terms of

1 plate tectonics and that zone is the one which created the
2 devastating earthquakes of Yakutat Bay at the
3 turn of the century. Those earthquake epicenters play
4 a big role in the presentation of the seismic data that
5 Stevens & Milne show on those acceleration contour
6 diagrams that we've been using in our seismic analysis.

7 The indications are that
8 the long rolling seismic events are associated with the
9 Fairweather/Queen Charlotte fault system and its correlative
10 in Alaska. These are the ones which gave Anchorage all
11 the grief and related communities. However, I don't deny
12 there is still a seismic risk and Foothills are designing
13 conseniatively for it.

14 Anything they can do to
15 get away from the Shakwak fault I'm all in favor of, and
16 they indicate now that they may be going the Klondike
17 route, and I can say with much more assuredness that the
18 Tintina fault is a dead issue, and the thing hasn't
19 moved to jiggle any seismologers since records have been
20 taken, although Dr. Owen Hughes claims he has evidence
21 of associated faults nearby which may have moved five
22 or ten million years ago. That's the best we can do for
23 the Tintina fault system right now. I'll leave it at
24 that.

25 MR. ROED: Thank you very much,
26 Carl. That clears it up. One other--if I may, reply to the

1 icing that you have pointed out. I want to thank you very
2 much for that, because we really didn't know about that
3 occurrence of icing, but I just want to reiterate the
4 basis on which we compared the icing potential along these
5 routes.

6 Basically it was on drainage
7 characteristics of the route, and I'm sure that there are
8 probably areas along the Mackenzie that should have been
9 included too, because it's probably a fairly common occurrence
10 once you disturb the ground and present a barrier to near
11 surface ground water flow.

12 But we fundamentally used
13 the texture and the slope and I never saw hardly--and I
14 looked at all the photographs of both routes. I have not
15 seen any evidence of this kind of widespread seepage that
16 could cause icing along the Alcan route. It's probably
17 because they're too small to see on the photographs. You
18 can certainly see them in the Mackenzie, potential
19 areas. So, I thank you for that.

20 MR. CHAIRMAN: Any more
21 comments on the geologic issue? Well, I think we're
22 through pointing out the faults of the Yukon. We'll
23 break for coffee.

24
25 (PROCEEDINGS ADJOURNED)
26

1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT).

2 MR. CHAIRMAN: Mr. Carson
3 Templeton?

4 MR. TEMPLETON: Mr. Doyle
5 said that he was asked a question today on controls.
6 Could he make a very brief statement on that?

7 MR. CHAIRMAN: Sure. No,
8 just make a statement and then come back to you.

9 MR. DOYLE: Mr. Chairman,
10 this afternoon, you charged us with two questions. One
11 was in utilizing the knowledge gained on the Mackenzie
12 Valley work that's been done over the past several years
13 and the other one was related to the comparison of routes
14 from an environmental point of view.

15 I'd like to address now the
16 first question about the utilization of knowledge or what
17 lessons we've learned in the Mackenzie Valley work over
18 the years. It seems to me that seeking precision in
19 assessing or predicting impact in many disciplines, par-
20 ticularly in the biological area, can be futile in the
21 absence of a knowledge of what controls will be applied.

22 To achieve precision, one
23 must know exactly what the contractor who is out building
24 the pipeline will do or what he will not do. One can
25 assume that a contractor will have good intentions or that
26 he won't. We must recognize that this is a big project

In terms of the biological environment, including mammals, birds, fish and vegetation, the environmental assessment index came out to be twenty-two hundred and twenty-eight without controls. With controls, it was eleven hundred and forty, just about half.

1 So here we can see a tremendous
2 difference in the impact that one would predict, depending
3 upon whether one assumes controls or doesn't. The question
4 then arises, what does this mean for your deliberations?
5 Making decisions on routes and assessing impacts is only
6 meaningful when one has a clear indication of the controls
7 that will be exercised and realized on the project.

8 Prior to 1971, we didn't have
9 Land Use Regulations in the North and there were many
10 complaints about summer seismic operations et cetera.
11 Subsequent to the Land Use Regulations being implemented,
12 there was reported considerable improvement in northern
13 drilling and exploration operations, a result of controls.
14 A later revision of these regulations has resulted in
15 further improvements being reported.

16 So, how we assess impact
17 depends on whether we look at it with controls, without
18 controls, with some controls or with a lot of controls.
19 The output will vary quite substantially, depending on how
20 stringent the controls are. I would recommend that this
21 Inquiry should be putting forward the concept that the
22 first priority should be given to the development of
23 controls. Then, in the light of these controls, one can
24 predict impacts much more accurately.

25 We have looked at the
26 Mackenzie Valley project over many years since 1970 and we

1 found that of course, field inspection was imperative of
2 the project, but for field inspection to be meaningful,
3 there must be office reviews that occur of that project
4 before the field activities occur. For those office
5 reviews to be meaningful, there must of course be stipu-
6 lations and control measure set out beforehand.

7 So I think that this Inquiry
8 in wrestling with the many route alternatives and the
9 various analysis we've heard here today, each person in
10 presenting an analysis is in his own mind, assuming a
11 certain level of control. But yet there is no body of
12 information before us that says exactly what those controls
13 are and therefore, I would recommend that you consider
14 giving in your recommendations, top priority to the
15 development of the controls and stipulations for any pipe-
16 line project.

17 MR. CHAIRMAN: Thank you.

18 Mr. Trevor would like to ask you a question Mr. Doyle.

19 MR. TREVOR: Really, it isn't
20 a question.

21 MR. CHAIRMAN: A comment.

22 MR. TREVOR: A comment if I
23 may indulge. I'd just like to thank Mr. Doyle for the
24 most complimentary words I've heard on the Land Use
25 Regulations in a long time.

26 MR. CHAIRMAN: I think we

1 better leave it there. Mr. Templeton?

2 MR. TEMPLETON: Dr. Hill, I
3 wonder if the report that we're talking about here, that
4 we were going to consider, was the comparison of the
5 gas Arctic route and the Alaska Highway route. The one
6 along the highway rather than through Dawson, and I can
7 either give you a thirteen, fourteen minute summary or I
8 can just throw it open to questions. It doesn't matter to
9 me.

10 I think the report has been
11 around for a week or so and perhaps there is no need for
12 me to read a summary.

13 MR. CHAIRMAN: Yes, I think
14 you came up with a relative ranking. This Inquiry has
15 heard methodology from Mr. Jacobson that you used, both in
16 your initial environmental evaluation and I also believe
17 in this report. I believe you came out on a ranking
18 of two to one or two and a half to one, something like that
19 in favour of the Alaska Highway route.

20 It might be worth pointing out
21 that the analysis was done for the north of 60 portion
22 only, is that correct?

23 MR. TEMPLETON: That's correct.

24 MR. CHAIRMAN: I suppose one
25 of the questions is, on a mile-by-mile basis, what would
26 be the ratio?

1 MR. TEMPLETON: Well, I think
2 the way that I would look at that is, this has come up --
3 there is a report -- somebody didn't put their name to it --
4 supposedly from Canadian Arctic Gas as a critique of this
5 and that was one of the points in it. That was the lead
6 point I think, but I think one of the ways that we should
7 be looking at these things, I find difficulty in looking
8 at mileage without -- what it goes through, the quality
9 of the environment and a number of other factors have to be
10 taken in addition to mileage.

11 In addition, there is the
12 problem that we all have and I think you've already come
13 to that in limiting your considerations to Canada north of
14 60. Canadian Arctic Gas feels very strongly that you
15 should start at Prudhoe Bay and go to the U.S. Border,
16 both routes and then compare them.

17 I think there is a fairly
18 important principle when you're comparing routes and if you
19 had a farm and you had two people that wanted to cross
20 it with some kind of pipeline or other structure, and one
21 of them was going to go across the corner and the other
22 one was going to wind all through your farm, I don't
23 think you'd have much trouble in deciding that what you
24 were looking at was the damage to your farm, not the cost
25 to the pipeline company.

26 I really think that's what

1 we're up against in routes. I think we're being asked to
2 consider the impacts on Canada and I have a little difficulty
3 stopping at the 60th parallel because I kind of think B.C.
4 and Alberta, you've got to think of them a little bit. But,
5 since we don't have the information, we limited ourselves
6 ^{the} to/north of 60.

7 I think that's a fairly
8 fundamental point and I don't know whether I've got it
9 across tonight, but I've had trouble getting it across
10 everywhere I've tried it.

11 MR. CHAIRMAN: No, as a
12 Canadian sitting in Whitehorse as a northern Canadian I
13 guess, I can understand your point. It's just that there
14 also is a possibly a false impression if one does not
15 bear in mind that the Mackenzie Valley route is much
16 longer, double the length more or less and therefore on
17 a mile-by-mile basis, it isn't that much difference by
18 your comparison. Although I take your point that Canadian
19 policy-makers must look at the environmental charge to
20 Canada as a whole.

21 MR. TEMPLETON: Yes.

22 MR. CHAIRMAN: Are there any
23 questions from the panel? I'll ask down here first, Dr.
24 Beanlands. Are there any questions from any of our
25 advisers on the -- by the way, have you had a chance to
26 look at this document Dr. Rennie and Dr. MacKay? Do you

1 have any comments on it? No. Okay. Mr. Bouckhout?

2 MR. BOUCKHOUT: No sir.

3 MR. CHAIRMAN: Dr. Beanlands?

4 DR. BEANLANDS: Mr. Templeton,
5 can you jog my memory, was the overall ratio 1.4 to 1 in
6 favour of the Alcan?

7 MR. TEMPLETON: That's in
8 Table 1 in the --

9 DR. BEANLANDS: Yes, I just
10 wanted to make it clear that it wasn't two or something
11 that I said before. Following on that, and I realize again,
12 I'll have to ask for your opinion.

13 MR. TEMPLETON: Yes, I
14 suppose I should -- I think what he was talking about when
15 he said 2 to 1 was the physical environment.

16 DR. BEANLANDS: Fair enough.
17 But the overall was 1.4 to 1.

18 MR. TEMPLETON: That included
19 of course, the human.

20 DR. BEANLANDS: Yes. I'd
21 like to ask you your opinion. I don't think you can give
22 me a definitive answer because obviously you didn't include
23 the Dempster lateral in the comparison, but given the
24 staid importance of the Porcupine caribou herd as one
25 element that would affect the overall ratio, do you think
26 that the ratio would be changed significantly? I'll let

1 you define significantly in your own terms, in what we
2 have now, if the Dempster lateral was included.

3 MR. TEMPLETON: I have a
4 speech prepared.

5 DR. BEANLANDS: I didn't know
6 that or I wouldn't have asked it.

7 MR. TEMPLETON: Mr. Hernandez
8 says I've already given it, just be quiet. But the thing
9 that I have difficulty with is I can't accept the principle
10 of the incremental approach to the gas line on top of the
11 highway. We don't know what the impact on the highway is
12 and I think with the state of my knowledge now, which is
13 not very great, but I can't even accept the highway. To me
14 it's not acceptable.

15 DR. BEANLANDS: That's like
16 trying to ignore a mosquito bite after it's bitten you.
17 I mean it's there now.

18 MR. TEMPLETON: Well, yes,
19 but you look around the United States and you'll find that,
20 take the half finished jet airport in the everglades and
21 it's vacant. It's sitting there and there are quite a
22 number of projects in the United States that have been
23 abandoned, nuclear projects and others, that have been
24 abandoned in midstream.

25 I think that Canada is going
26 to have to take a look at where it's going and sometimes

1 admit that we don't want it because you know, I have heard
2 a lot about the Porcupine caribou herd. We've been studying
3 it since 1970 and I think that that road is going to make
4 a very material effect on it.

5 It may change its wintering
6 grounds and maybe it can adjust to a different wintering
7 grounds or something, but maybe it can't. It's one of
8 Canada's phenomenon that I think is our heritage and the
9 Old Crow Indians -- I shouldn't say the Old Crow Indians,
10 people have been using that herd for twenty-eight thousand
11 years according to the carbon dating of that bonescraper
12 found on the Porcupine River.

13 So, when you have something
14 like that, I don't think we should treat it lightly and if
15 it's necessary to close the road, well I think that's
16 what we do.

17 DR. BEANLANDS: I take it
18 from your circuitous comments that you're not prepared
19 to answer my questions.

20 MR. TEMPLETON: I haven't
21 even started with the speech yet.

22 MR. CHAIRMAN: Well, I'll ask
23 it a different way then. Assuming the road is closed, how
24 would you rank the Arctic Gas proposal versus the Dempster
25 plus the Alaska Highway?

26 MR. TEMPLETON: Oh, I see. I

1 got so carried away with my speech, that I didn't even hear
2 the question. We thought about that and tried to see if
3 we could do that and actually we started to break the
4 Canadian Arctic Gas down into sections and I think we
5 actually have done it.

6 One section from the Alaskan
7 border to the Delta and the other section from the Delta
8 south to the 60. But to make a really valid comparison,
9 I think you have to factor in a time frame and I don't
10 know how to do that because I accept Berger's recommen-
11 dation that ten years should elapse before -- basically
12 before either of those routes are done.

13 So I don't know how to --
14 bearing in mind we're talking about the human environment
15 in our studies as well as the others. How you put ten
16 years, the perception as to the people, particularly in
17 the Delta of a project ten years from now and be very
18 accurate. I think that it's pretty hard to do. There's
19 a lot of things involved in it. One is you can consider
20 the gas fields around the Delta as a Canadian resource
21 that you want to save for your children and use it by
22 saying, well, let's have a shortage in Canada so that
23 we're going to force conservation on everybody.

24 Or you could say, let's buy
25 oil from the Arabs as long as they'll sell it to us,
26 because the cost of Delta gas and the cost of oil is about

1 the same. I think -- I shouldn't say they're the same,
2 but I think they're not -- they may be ten or fifteen per
3 cent apart and thereby save the resources of the Delta for
4 another generation. You know, I'm worried about whether
5 there is even going to be enough in my lifetime and I
6 don't know about you Dr. Beanlands, but you're a lot younger
7 than I am and I think you're going to freeze to death.

8 MR. CHAIRMAN: Let me assure
9 you, he's not running out of gas.

10 MR. TEMPLETON: I'm not either.

11 DR. BEANLANDS: Mr. Chairman,
12 if I didn't know better, I would say that Mr. Templeton
13 was a lawyer born in Philadelphia.

14 MR. CHAIRMAN: Are there any
15 more questions for Mr. Templeton? Yes, Dr. Roed ?

16 DR. ROED: : I always have
17 trouble understanding, as a geologist, the actual impact on
18 various biological features of our environment or living
19 things. I'm a little -- Mr. Templeton's comments, I
20 listened to with regard to the Porcupine herd and the
21 highway. I also heard one of his colleagues a little
22 earlier, indicating that you shouldn't evaluate these
23 things until you know what controls are going to be put
24 on.

25 I don't really understand
26 what the actual impact - what the concern is with the

1 Porcupine herd and perhaps there's somebody here that can
2 enlighten me on that, but supposing it was a hunter pressure,
3 traffic. Isn't there some way that you could close the
4 highway down during critical periods of migration or is it
5 just a physical presence of the highway that is in some
6 manner, going to destroy this herd.

7 MR. CHAIRMAN: Dr. Roed, I
8 think there are caribou experts here that would be happy
9 to fill you in, but we have spent half a day on the
10 Porcupine caribou herd and on that particular question, so
11 I think it would be best if you either read the trans-
12 cripts or else I can direct you to Dennis Surrendi. But
13 I'd rather not get into the Porcupine caribou herd again
14 tonight.

15 DR. ROED: Okay, fine, but I
16 was really wondering about the contradictory statements
17 of Mr. Templeton and also his colleague there. I mean, I
18 just don't -- okay, well, we'll leave it.

19 MR. CHAIRMAN: You're
20 suggesting that it's a chicken and egg situation that you
21 don't know what the controls will be until you studied
22 the environment and you'd have to study the environment
23 and do the assessment before you know what controls --

24 DR. ROED: Well, that's what
25 he -- yes, but at the same time he says he's dead against
26 any activity on the road - abandon the road. Well, it

1 just doesn't make any sense to me.

2 MR. CHAIRMAN: Would you
3 like to comment on that?

4 MR. DOYLE: I think from
5 what you've said Dr. Hill, that many people have studied
6 the caribou herd and therefore, would be in a position to
7 define what controls would be applied. When one talks
8 about -- if we were just talking about a Dempster Highway
9 as it now exists, with the suggestion of Dr. Roed that
10 the highway be closed for periods of time during the year.
11 Well, those who would assess the impact of the highway,
12 would have a very different assessment of that impact, if
13 in one case they were being told that highway will be
14 closed as you recommend.

15 If that recommendation were
16 to say the highway were closed just as an example, between
17 October - some dates in October and it will ^{be} closed again in
18 March and people will monitor us and change it from year
19 to year. Then I think the biologist would have a very
20 different assessment of impact on that herd, than if he
21 were just to assume that hunting pressure would exist along
22 that highway whenever the caribou were there. So I don't
23 see it as this chicken and egg cycle chasing your tail
24 around.

25 In a general sense, one can
26 look at the absence of data and many people today have

1 talked about the absence of data. To my mind, there are
2 a number of ways of approaching an absence of data. One
3 is that you can say, let us assume the problem existed. We
4 haven't been there to see if the species is there and if
5 it's migrating or wintering or spawning or whatever, but
6 let us assume for the moment that it were there.

7 If you could see a control
8 measure to apply that would be relatively inexpensive for
9 a pipeline company to apply, then would the need exist to
10 go and study for a long period of time, whether the fish
11 migrated through there, whether they spawned there, if in
12 fact, the fisheries biologist was content with a certain
13 specified control.

14 So my point would be, in some
15 instances, not in all, but the control measure could be
16 defined in the absence of data by assuming that all the
17 important aspects really occurred and existed there.

18 MR. CHAIRMAN: Well, you
19 bring up an interesting point because this was -- the
20 fisheries' point was actually brought up at this hearing
21 and the argument was, since we didn't know what the
22 fisheries resource was, which fish ran when and where and
23 where they spawned, then the crossing should all be aerial.

24 That's a control, but it's
25 not a control that Foothills was willing to accept carte
26 blanche. They would rather study the streams and determine

1 the window that was available in between the spawning
2 runs and the emergence of the fry and so on and select
3 a time crossing the river that was appropriate for that
4 particular river. Each particular river is a particular
5 problem, so that the control in general, philosophical is
6 known, that you choose a time window and put the pipe in
7 the ground under the river when it's / ^{of} minimum interference,
8 when it would have minimum interference with the fisheries
9 resource.

10 But in order to determine that
11 time window, one has to study the resource.

12 MR. DOYLE: Indeed, I think
13 your example makes the point I was trying to get at and
14 that is that in that case, the control is an expensive
15 measure and it is more the cost benefit analysis would
16 indicate that you're better off to study and see if the
17 problem in fact exists, rather than institute the control.

18 In other instances, in fact,
19 the control may be far more economical than carrying out
20 the studies. A simple example that comes to mind might
21 be with regard to water fowl. Having studied an area over
22 a year, looking at the spring migrations, nesting, fall
23 staging and so on, one might come to a point that if you
24 found a lot of the birds there, that you might institute
25 altitude limitations.

26 Well, in that instance, I

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1 would suggest that if people were confronted by an absence
2 of data, they could institute the altitude restrictions in
3 the first instance and obviate the necessity to do the
4 detailed studies.

5 MR. CHAIRMAN: Thank you.

6 Mr. Trevor?

7 MR. TREVOR: This leads me
8 into something that I've been wondering about earlier, if
9 you impose the altitude restrictions under those conditions,
10 how is a biologist going to find the nesting site?

11 MR. DOYLE: I could tell you
12 a joke, but I won't.

13 MR. CHAIRMAN: Any more
14 questions for Mr. Templeton? It must be getting towards
15 the end of the hearing. Mr. Klassen would like to address
16 the panel.

17 MR. KLASSEN: Thank you Mr.
18 Chairman. I have a few points that I'd like to make. This
19 will probably be the last session is that right?

20 Mr. Parkinson will probably
21 think that I was making an exception yesterday if I don't
22 make some comments on Mr. Rennie's comparison study, so
23 I'll just repeat that in the absence of more data, the
24 Yukon Game Branch does not feel that a route comparison
25 is valid.

26 My intuitive feeling is that

1 the placing of number two on the Dempster for wildlife and
2 number one on the Canol-Alcan route, was the correct one,
3 but I have to ignore that too because I don't have the
4 data to back up that feeling.

5 The point that Dr. Roed made
6 is well taken, that you can compare apples with apples,
7 meaning I suppose that the data base is similar in the
8 routes that were compared, but with respect to wildlife,
9 I feel that in order to compare those apples, you have to
10 know the degree of rottenness or the degree of unrottenness,
11 whichever.

12 Another point that I want to
13 make and that I should^{have} made the other day when N.C.P.C.
14 was here, in our original presentation to this panel in
15 June, we talked about direct and indirect impacts. Our
16 Commissioner has been quoted in the paper as saying that
17 the pipeline project should be viewed on its own merits
18 and not as something that would initiate a chain reaction
19 of development.

20 N.C.P.C. doesn't appear to
21 hold that view and if I recall the figures correctly, they
22 said that our present electrical consumption is something
23 in the order of eighty megawatts and that Foothills, if
24 their compressor stations were electrified, would consume
25 something in the neighbourhood of three hundred megawatts
26 -- a hundred and sixty. Well, we're looking at then, a

1 doubling in the consumption of energy and I suggest that
2 if the construction of the pipeline results in the kind of
3 hydro development that would be necessary to supply that
4 need and the construction of dams and the flooding of
5 river valleys, which in some instances, are critical
6 winter habitat for wildlife and the clearing of transmission
7 lines, then that must be taken into consideration when a
8 recommendation is made as to whether or not approval should
9 be granted for the construction of a pipeline.

10 The third point that I want
11 to make is that in the discussions that we've had here
12 about methodology, I hope that when the panel writes up
13 its final report, that whatever weighting wildlife gets in
14 whatever methods you use in determining impact, environ-
15 mental impact , that that rating will be fairly high
16 because of the value - the perpetual value of wildlife
17 that's indicated in our brief and in one of the appendices,
18 one of the reports that we've attached to it.

19 The final point that I want
20 to make is that a lot of time and money and man hours are
21 expended on research, relative to environmental impact.
22 What I'm referring to there is the money that is spent
23 by the consulting firms and the money that is spent by
24 government agencies. Sometimes, there is an unnecessary
25 duplication of effort. It is of course, important that
26 the government knows something about the -- well, in this

1 case, wildlife in an area that may be traversed by a
2 pipeline, in order to be able to comment intelligently on
3 the results that the consulting firms come up with. But
4 I think that if there was greater co-operation between the
5 consulting firms and the government agencies, as there has
6 been during this brief period this summer, when we at the
7 field level, have had good co-operation with the Beak
8 Consultants, that we can make much more efficient use of
9 the time that's available between now and whenever go
10 ahead, if one is given for a pipeline, takes place.

11 Those are all the points that
12 I wanted to make and perhaps Mr. Rennie will want to
13 comment on what I said about the route comparisons.

14 MR. CHAIRMAN: Thank you Mr.
15 Klassen.

16 DR. RENNIE: I think my
17 comment would be perhaps by way of a question. I think I
18 would agree wholeheartedly that wildlife should receive a
19 suitable weighting, but I would really like to know in the
20 concept of weighting wildlife, whether one looks directly
21 at a wildlife interest as a resource and so forth, or
22 whether one also takes into account, the indirect wildlife
23 implications that would be inherent in the geological
24 data and the various factors which are identified on the
25 charts behind. Because indirectly, they affect wildlife
26 insofar as if they are not given due consideration, then

1 unsuitable terrain could be taken into account, could be
2 the site of construction which would involve perhaps
3 problems with maintenance, problems with repair, which
4 would give repeated problems to wildlife, subsequent to the
5 initial construction.

6 I think that in talking of
7 weightings, we want to be very clear on how we're going to
8 weight these things, not just look at perhaps the immediate
9 and superficial effects, but to take into account, the
10 other features of the environment - the physical factors
11 which indirectly have a very profound effect upon wildlife.

12 MR. KLASSEN: I'm not sure
13 that I recognize the question in that. I appreciate what
14 you were pointing out and I wasn't or didn't mean to imply
15 that wildlife should only be -- should be the main con-
16 sideration, however, it must receive the weighting that
17 is due it because of the fact that it is something that
18 we can maintain in perpetuity if we take reasonable
19 precaution in selecting a route.

20 All of that has to be taken
21 together, the geotechnical information that applies and
22 the wildlife concerns have to be given the required -- well,
23 I can't say required because I don't know what would be
24 required as a factor or what weighting would be required,
25 but I have the feeling that it is sometimes considered as
26 an afterthought and I want to make sure that that isn't the

1 case in the final analysis of the panel.

2 MR. CHAIRMAN: Thank you. I
3 believe Jeff Stein has some questions he'd like to put to
4 Mr. Bouckhout.

5 MR. STEIN: Thank you Mr.
6 Chairman. I'm afraid I'm going to beat a few more dead
7 horses here but I'd like to get a few points straightened
8 around in my own mind at least. I shall attempt to control
9 myself and at least keep it brief.

10 I'd like to start off with
11 the absence of data again. In the case of Arctic Gas,
12 they've had at least seven years of intensive study on
13 fisheries and both into identifying fisheries resources
14 and concerns associated with the proposed pipeline route.

15 Additional study requirements
16 were also identified before the Berger Commission which
17 would require a minimum it was felt, of two to three years.
18 That work of course, was given appropriate funding and
19 manpower.

20 Now, as I understand it,
21 Foothills proposes to initiate construction in the summer
22 of 1979. Given the present state of knowledge relative to
23 the Arctic Gas proposal, I wonder if one of you gentlemen
24 would care to comment on what you feel the fisheries data
25 base will be by the summer of 1979.

26 MR. BOUCKHOUT: I'll begin the

1 comment on that particular question and turn it over to one
2 of our biologists who's just come out of the field who
3 could probably give you a better indication that I can,
4 since he works directly on the fisheries program.

5 Perhaps we are flogging a
6 dead horse, but you say Arctic Gas or let's say the Mackenzie
7 Valley has seven years of intensive data. Does that really
8 constitute seven years on every stream continuous data.

9 MR. STEIN: No, of course not,
10 I would think.

11 MR. BOUCKHOUT: To my
12 knowledge, what it does constitute essentially, is perhaps
13 periodic visits to various streams, some only once, some
14 perhaps more than once with weirs set up on various
15 select streams.

16 Now, the question is, how
17 much data do you require. We've heard plenty about how
18 much data some people would want, but how much do you
19 really need in light of the kinds of mitigative measures
20 one can apply. The more successive years you have of
21 information, and the more information you have per year,
22 the better ones predictive capability is going to be.

23 But there is definitely a
24 point of diminishing returns. It must be looked upon in
25 light of the kind of project it is. It must be looked
26 upon in a light of the kind of impact that project can have

1 on a stream, is in fact, a pipeline project the kind that
2 will devastate a stream forever. I don't think so. I
3 would be surprised if you thought so.

4 So it's really a matter of
5 looking at it in perspective, at worst case, what might you
6 do. You might have a serious effect on one year cohorts.
7 Given the nature of streams, we've talked about siltation,
8 we've talked about the effects of siltation, spring
9 flushing, et cetera. I don't think that a pipeline
10 properly constructed - and when I say properly constructed -
11 I mean constructed so its integrity is guaranteed as much
12 as is humanly possible which is obviously an interest to the
13 company, that the construction of a pipeline at worst
14 case, will have any more than a serious effect on one year
15 cohort of fish in one stream.

16 There may be some spin-off
17 effects for a short period of time, but with that, I will
18 turn it over to Mr. Fernett here with respect to the
19 amount of data which may be available.

20 MR. FERNETT: Just to add to
21 what Mr. Bouckhout had said, along the Alaska Highway,
22 there was a greater data base to start with I believe than
23 there was in Mackenzie Valley. For instance, the salmon
24 movements have been watched in the southern Yukon for
25 quite a few years and they have identified major spawning
26 runs and some of the major spawning areas.

We have of course, taken any data that was available, into consideration. We are in the process of examining all these streams as if this data base didn't exist and documenting what we find. We're doing it -- we're thinking in terms of a two year program. The first year going through and looking at all the streams and identifying problem areas, pointing out site-specific areas for study in the second year. I think this is quite feasible and this is quite possible.

MR. STEIN: Well, I'll just add one more brief comment to that. I will not argue by the way, your basic assumptions in looking at a pipeline routing in general. On specific streams, I think it's quite possible that the fish resources could be totally lost that are there. I'm looking at critical habitats now - spawning habitats, over wintering habitats in particular.

Fisheries and marine service has I think, put top priority on habitat identification. I think this, it's reasonable to say that CAGPL has put a considerable amount of their effort along the same lines. Especially at the Berger Commission, it was abundantly clear that we both failed, so I just add that as I say, as a further comment that despite all this work and effort that we can design mitigating measures, but we're really going to have to go on the conservative side, because

1 inevitably these critical habitats -- I would say the
2 majority of them are not going to be identified.

3 MR. BOUCKHOUT: Can I ask a
4 question. How would you perceive critical habitats being
5 obliterated via pipeline construction on a river crossing
6 in the long term?

7 MR. STEIN: Well, I would use
8 the situation of that pipeline crossing happened to be
9 going through a spawning area, then say it is a very limited
10 spawning area. In a case like that, it's possible I
11 suppose that if you're placing your emphasis on the
12 crossing area alone, you may actually identify it as a
13 spawning area. That's conceivable, right.

14 MR. BOUCKHOUT: Well, that's
15 the objective of course of the studies, to look at the
16 crossing areas, not only from perspective of fish present
17 or absence in fish activity in the area, but bed substrate
18 and the implications of the bed substrate, both at the
19 crossing and downstream of the crossing.

20 MR. STEIN: Well, I won't
21 belabour the point and go into downstream effects any
22 longer. I'll go on to my second one for you.

23 Mr. Chairman, I suspect that
24 many of the fisheries concerns relative to pipeline and
25 stream crossings of course, well obviously, they have
26 already been discussed in front of the panel and I'm

1 referring here to sedimentation effects, critical habitat
2 disruption, blockage to migration, the frostball effect,
3 et cetera.

4 But some of these concerns
5 could be eliminated and others minimized if the crossings
6 were elevated rather than buried. Now, this same point as
7 you're aware, was brought I believe on Tuesday, regarding
8 the Yukon River crossing. Comment was made by Foothills
9 that this simply was not the way to go, that being an
10 elevated crossing.

11 But I wish to point out,
12 however, that Alyeska has employed numerous suspended
13 river crossings including that of the Yukon River and also
14 that the Foothills Maple Leaf proposal states that existing
15 stream crossing trestles will be made use of wherever and
16 whenever possible in constructing laterals.

17 Now, the point I'm trying to
18 make is that fisheries disruption could be minimized for
19 many of these crossings if use were made of the existing
20 Alaska Highway bridges, recognizing of course, that
21 bridge construction -- reconstruction rather, may be
22 necessary in some cases. I just wonder if you would care
23 to comment on whether this alternative is being given any
24 serious considerations and if not, why?

25 MR. CHAIRMAN: I think Mr.
26 Stein, we've gone into this as a panel - the Shakwak

1 Project is under -- is being planned which a lot of the
2 bridges will be re-designed and reconstructed and we've
3 gone into this issue at some length along the Alaska Highway
4 route, whether or not it is possible to put bridges on --
5 pipeline on old bridges and new bridges and it comes down
6 to one of design whether or not the existing bridge will
7 hold a pipeline and whether or not the old bridge can be
8 used in some other place.

9 Of course, the preference for
10 the pipeline company has stated many many times in this
11 hearing, is not to have it above-ground at all. I wonder
12 how much we're adding as a panel in going through the
13 same questions again. Possibly, on the other hand, I
14 don't want to avoid any questions that haven't been
15 thoroughly discussed in front of the panel.

16 I wonder if it's possible
17 just to go through your questions and I'll ask Mr.
18 Bouckhout to answer those that haven't been thoroughly
19 discussed.

20 MR. STEIN: Well, I apologize
21 for that, Mr. Chairman. I was not here when this was being
22 discussed. It just was a point that I wanted to bring
23 in to be sure that it was being given some consideration.

24 MR. CHAIRMAN: Fine.

25 MR. STEIN: My next question
26 then was that -- while mitigating measures can be incor-

1 porated into project design, their effectiveness especially
2 when dealing with aquatic environments, often cannot be
3 determined until actual construction.

4 One of the best methods
5 rather of measuring environmental performance is the
6 monitoring study which itself may be useless unless natural
7 variations in environmental parameters have been monitored
8 -- have been determined rather over a number of years prior
9 to disturbance.

10 I was wondering if Foothills
11 would care to comment on any planned monitoring programs,
12 their present status and the parameters to be monitored.

13 MR. BOUCKHOUT: We have not
14 to this time, defined particular monitoring programs. The
15 kind of data which is being collected we feel, is of the
16 nature and intensity that it can be used in monitoring
17 studies. I'm sure one would not contemplate detailed
18 monitoring studies at every river crossing and there are
19 crossings which will have an abundance of data collected
20 over many years.

21 This is not necessarily by
22 our own teams, but by fisheries and marine service.
23 Additionally, you're speaking of monitoring biological
24 parameters when you're speaking of many years data in
25 particular.

26 I suppose it's a matter of

1 debate as to how one can discriminate or might be able to
2 discriminate between what might be construed as pipeline-
3 related impacts which might cause a change in -- for
4 instance, population numbers in any particular year.

5 I don't personally have a
6 handle on non-development historic data on fisheries
7 populations, but having some familiarity with population
8 studies in general, I would suspect that the data gathered
9 on fisheries populations would probably display a consider-
10 able seasonal yearly fluctuation in any respect.

11 With respect to monitoring
12 to add another element, I would view the monitoring of the
13 physical base as equally important to the monitoring of
14 the biological components, being as the biological
15 component is dependent upon the physical base for survival.
16 We have considered, although have not defined particular
17 programs for monitoring which will include biological
18 monitoring where it may be valid on the basis of existing
19 information, as well as physical monitoring particularly at
20 such locations as stream crossings.

21 MR. STEIN: Okay, well you
22 partly touched on my next question here and this is a
23 problem that I foresee for any pipeline developing. That
24 relates to local fisheries, be they sport, commercial or
25 domestic. It's always been my feeling that any major
26 decrease in catch in these fisheries, be it during the

1 construction or post-construction periods, are very likely
2 to be blamed on that pipeline.

3 Now, this is the part that
4 you just touched on that we recognize that fish populations
5 fluctuate quite largely for other reasons, both natural
6 and otherwise, but I'm just wondering how Foothills will
7 react when say losses from a domestic fishery are blamed
8 on the pipeline and no other reasons for the decline are
9 apparent.

10 In other words, what are you
11 going to do when the fish hits the fan?

12 MR. BOUCKHOUT: That's a hell
13 of a good question. That's one we have discussed to a
14 degree here. We've discussed it from the perspective of
15 what kind of a mechanism the pipeline company and the
16 government could set up in terms of compensation.

17 We have reached really no
18 conclusion other than the fact that some mechanism is
19 going to be necessary. I would personally not hazard a
20 guess as to what the most appropriate mechanism may be,
21 although as I say, it has been discussed in terms of
22 what representation would be required, at what level
23 should claim, if in fact claim is made, at what level
24 should that be made, should it be a tribunal staffed by
25 various representatives from various knowledgeable or
26 appropriate agencies? I really wouldn't know. I'd

1 appreciate your comments on that as well.

2 MR. STEIN: Well, I won't
3 comment on that right now, but this did partly tie in to
4 my previous question and that is whether any thought has
5 been given to say developing a monitoring program per se
6 on catches in these fisheries. Again, sport, domestic and
7 commercial.

8 MR. BOUCKHOUT: Again,
9 particularly with respect to sport and domestic, obviously
10 a collection of data is not only difficult, but the data
11 you end up with is relevant to unit effort which is
12 additionally difficult to get.

13 If one is speaking of
14 commercial fisheries operations, I suspect that that may
15 be a little bit easier to confront. I'm not entirely
16 sure, but I would think that for instance, your own
17 department would collect information on catch of commercial
18 fisheries since as I recall, quotas are set. In that
19 respect, if that assumption is in fact true, then there
20 should be historical data available.

21 With respect to commercial
22 or to sport fisheries rather and domestic fisheries, I'm
23 not so sure that any kind of data one could collect would
24 be valid in that respect.

25 MR. STEIN: Okay, the next
26 comment that I had here was that in a brief presented I

1 believe, before the panel, entitled "Arctic Gas Environmen-
2 tal Comments on the Alaska Highway Gas Pipeline Project",
3 Arctic Gas developed a case around the life histories of
4 spring and fall spawning species and concluded that if
5 construction is prohibited during migration spawning and
6 incubation, there is no window when spring crossings can
7 take place.

8 I might add that in fact, the
9 same case could have been made for CAGPL if they wanted
10 to turn it around a bit, but I was just curious as to how
11 Foothills responded to this argument.

12 MR. BOUCKHOUT: That is
13 definitely a possibility if one is to define a window as
14 a particular time when there are no fish in a particular
15 reach of a river. I think you would have to adopt perhaps
16 a secondary definition of a window and that being a
17 acceptable or least impact period of time at which a
18 stream crossing could be made.

19 This would also tie into the
20 evaluation of the crossing itself, such that if a particu-
21 lar crossing were to be defined as one which is utilized
22 particularly for spawning of both spring and fall
23 spawning species, then it is quite likely that the most
24 suitable protection measure would be to relocate the
25 crossing.

26 On the other hand, if one is

1 looking at a particular reach which is used for spawning
2 by either one or the other or is simply used as a migration
3 route for even both, then in my estimation, migration
4 should not be considerably curtailed by pipeline crossings.
5 There will be siltation resulting from stream crossings
6 due to the physical activity of trenching the stream.

7 This activity is not a
8 twenty-four hour a day, many many day operation. It is
9 the experience in crossings that have been done or some
10 of the crossings that have been done and I cannot quote you
11 a particular paper, but the experience is that during the
12 time of intensive in-stream activity when the trench is
13 actually being dug, fish will in fact halt and not move
14 by the activity site. However, when the activity ceases,
15 the fish will proceed by the activity site.

16 In other words, the water is
17 still there, it's still flowing at its normal course, you
18 are not stopping the water movement, you are simply
19 creating an activity within the water. So that in that
20 respect, I think interruption of migration is probably
21 much less of a concern than is destruction of spawning
22 habitat for instance or over wintering habitat which is
23 another key factor.

24 So it's a matter of defining
25 your window, finding a a least impact time, if in fact,
26 the location of the crossing is such that significant

1 impairment of the population of the drainage is possible.

2 MR. STEIN: Okay, my final
3 point here again, may be one that has already been
4 discussed before the panel and if so, I will beg off. But
5 as I mentioned in my previous material, it's my opinion
6 that disruptions to aquatic environment can be lessened
7 by paralleling as many river systems as possible and this
8 again being provided a suitable set-back distance and
9 other mitigating measures.

10 However, as I see it, much
11 of the benefit gained by Foothills use of this method of
12 routing, may be lost through the frequent re-crossing of
13 some systems and I believe that the Swift and Koidern
14 rivers are two examples of this.

15 I just wonder if you could
16 explain or if you care to explain the reasons for this
17 criss-crossing of so many systems.

18 MR. BOUCKHOUT: No, Mr. STEIN,
19 I really couldn't. I expect that it would have something
20 to do with the geotechnical feasibility of constructing
21 a line in that immediate location. River crossings are
22 not the cheapest things to do and therefore, we would
23 minimize the number of crossings in due course as a means
24 to as much as possible, cut costs. But in those two
25 instances, I'm personally not familiar with the actual
26 reason for the duplicate crossings of a particular system.

1 MR. STEIN: That's all I have
2 Mr. Chairman.

3 MR. CHAIRMAN: Thank you Mr.
4 Stein. Before I close the hearings, does anyone have
5 anything to add? Mr. Rickter?

6 MR. RICKTER: Sorry to
7 disturb you. I'd like to make a comment as a citizen of
8 Canada and as a tourist to the Yukon. I'm not speaking
9 on behalf of Envirocon.

10 Personally, I find aerial
11 crossings quite revolting. They're unsightly to look at.
12 In case of the one that's been suggested for Dawson, I
13 almost retch at the sight of it. First of all, if you
14 can imagine yourself standing on a midnight come, looking
15 at the beautiful vista to the southwest of Dawson. You'd
16 have a great gawdy orange and white coloured aerial
17 crossing.

18 You'll never sell that to the
19 tourist, I'm sorry. Secondly, the aircraft pilots have
20 enough trouble as it is with the Yukon River, getting
21 their float planes off the river and adding something like
22 that, only compounds their problems.

23 Thirdly, I imagine a certain
24 number of avifauna uses the Yukon River as a flyaway.
25 Something like that I'm sure will collect more dead bio-
26 mass than the fish found on the river and the installation

1 of the pipe to start with. That's all I have to say.

2 MR. CHAIRMAN: Anyone else
3 like to add anything in summation. Mr. --

4 MR. THOMSON: I have one
5 question for Mr. Bouckhout. Earlier Mr. STEIN stated that
6 winter construction of the Alyeska pipeline in northern
7 Alaska was impracticable. To what extent, would construc-
8 tion of the Dempster take place in summer and if it must
9 be constructed in summer, does that not imply construction
10 of an all-weather road or as you referred to it, as pads
11 along the length of the line and therefore, essentially
12 a twining of the present road?

13 MR. BOUCKHOUT: Dr. Thomson,
14 we have not yet defined precisely how much winter
15 construction and how much summer construction would be
16 necessary on that particular line. The implication of the
17 necessity for a pad if it is to be summer construction,
18 would be related to the terrain conditions. If in fact,
19 an area were to be contemplated for summer construction
20 which is thaw stable and in that instance then, does not
21 have high ground ice content, then the magnitude of a pad,
22 if any which might be necessary, would be rather small by
23 comparison to an all-weather highway.

24 The pad would not be designed
25 such that it is another highway. In other words, a twining
26 of the Dempster. It would be of much lower profile. The

1 design criteria would be considerably different. In our
2 interest, given the proximity of the Dempster Highway for
3 access, we would not in general want to construct another
4 road because if we do construct another road, that
5 immediately puts us into the road construction business,
6 into the bridge business, into the culvert business, et
7 cetera.

8 So it's not in our interests in a case like that, where
9 we are able to gain ground access to the immediate site
10 of the pipeline via an existing transportation corridor.

11 MR. CHAIRMAN: Are there any
12 other points? Mr. Carson Templeton?

13 MR. TEMPLETON: This is speech
14 17A. You spent a great deal of time in these hearings
15 discussing research and I think you're having the same
16 problem that we all have in transmitting that into impacts
17 and the rest of it. But there is a point that I think we
18 should all recognize, is that the environment belongs to
19 Canada.

20 I think it should be a
21 condition of anybody, regardless of whether it's in the
22 private sector or the public sector, who is going to do
23 research on the environment, that he has to publish his
24 results or make them available in a library where they are
25 available to everyone.

26 I don't think there should be

1 such a thing as proprietary data on the environment and I
2 think at the present time there is. I think it rests in
3 consultants, it rests in various government offices and
4 with various government people.

5 There was a principle on the
6 Canadian Arctic Gas thing that I always found a great deal
7 of difficulty with and I understand that it also applies
8 on the Polar Gas line, is that the consultants are asked
9 to provide two reports, one a data report which they've
10 agreed to make public, but the opinions are not. I think
11 it should be a condition that anybody doing research, must
12 publish his material or he shouldn't be given a permit or
13 allowed to either have government funding or be allowed to
14 use the government data. Thank you.

15 MR. CHAIRMAN: Thank you.
16 Well, in closing these hearings, I'd like to say a couple
17 of words about how we went about our job.

18 We designed the proceedings
19 so that the panel could receive firstly, so the panel
20 could receive advice as freely as possible and I believe
21 we succeeded there. Secondly, so all participants could
22 receive information from each other through the process
23 and you would be the judge of whether that was a success
24 or not.

25 Thirdly, because of our time
26 constraint, so that the maximum amount of information

1 could be relayed to the panel as quickly as possible.

2 From my point of view, I think that the system has worked
3 and it's worked because of the participants. It's worked
4 because people had something to tell us and felt strongly
5 about what they wanted to tell us and they all came forward
6 and gave us their opinions freely.

7 I would like to thank all the
8 participants very much for that. Without that of course,
9 this hearing process could not have got off the ground.

10 So in closing, we have heard
11 from you and in two weeks or so, you will hear from us.

12 (PROCEEDINGS CONCLUDED).
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